

Title: A systematic review and meta-analysis of risk factors associated with atopic dermatitis in Asia

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Supplemental Table 1: Significant estimates of demographic factors and socioeconomic statuses

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, PR, RR)	Remarks
Demographic factors											
Age											
Acharya et al., 2019	3	Cross-sectional	Mixed	South Korea	≥19 vs. <19 years-old	6.9	2.9	16.37	≤0.001	OR	
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Age (continuous) (singleton born with normal birthweight and mother without diseases during pregnancy)	0.99	0.98	0.995	0.002	OR	Normal birthweight defined as 2500-4000g.
Ferrandiz-Mont et al., 2018	13	Cross-sectional	children	Indonesia	10-13 vs. 6-9 years-old	2.57	1.03	6.40	-	OR	
Guo et al., 2016	27	Cross-sectional	children	China	Age (continuous)	0.829	0.802	0.857	<0.001	OR	
Lin et al., 2016	30	Cross-sectional	children	Taiwan	2-4 vs. 0-2 years-old	0.40	-	-	<0.05	OR	
					4-6 vs. 0-2 years-old	0.20	-	-	<0.05	OR	
					6-9 vs. 0-2 years-old	0.22	-	-	<0.05	OR	
					9-12 vs. 0-2 years-old	0.29	-	-	<0.05	OR	
					12-18 vs. 0-2 years-old	0.38	-	-	<0.05	OR	
Miyashita et al., 2015	43	Cross-sectional	children and adolescents	Japan	Age (continuous)	0.91	0.88	0.94	<0.001	OR	
Song et al., 2014	52	Cross-sectional	children and adolescents	China	>8 vs. 6-8 years-old #	0.667	0.588	0.714	<0.0001	OR	AD outcome: lifetime chronic itchy rash
Lee & Kim, 2011	72	Cross-sectional	adult (residents ≥18 years-old)	South Korea	10-18 vs. <10 years-old	0.35	0.24	0.51	<0.05	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	12 vs. 6-7 years-old	0.80	0.64	0.99	-	OR	
					13 vs. 12 years-old (females in 1995-1996 study)	0.8	0.6	1.0	<0.05	OR	
					14 vs. 12 years-old (females in 1995-1996 study)	0.8	0.6	1.0	<0.05	OR	
					14 vs. 12 years-old (males in 2001 study)	0.5	0.3	0.8	<0.01	OR	
					15 vs. 12 years-old (males in 2001 study)	0.6	0.4	0.9	<0.05	OR	
Kawada et al., 2004	119	Cross-sectional	children	Japan	Age (one year)	1.12	1.05	1.19	-	OR	
Goh et al., 1996	139	Cross-sectional	children and adolescents	Singapore	12-15 vs. 6-7 years-old	1.07	1.02	1.13	-	OR	AD outcome: lifetime AD
Gender											

Wang et al., 2019	9	Cross-sectional	adults	China	Male vs. Female	0.68	0.54	0.86	0.001	OR	
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Male vs. female (singleton born with normal birthweight and mother without diseases during pregnancy)	1.14	1.09	1.20	<0.001	OR	Normal birthweight (2500-4000g)
Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Male vs. Female [#]	0.719	0.690	0.746	<0.05	OR	
Matsuoka et al., 2016	33	Cross-sectional	children and adolescents	Iran	Male vs. Female	1.363	1.122	1.655	0.002	OR	AD outcome: lifetime chronic itchy rash
					Male vs. Female	1.293	1.035	1.615	0.027	OR	AD outcome: current chronic itchy rash
					Male vs. Female	1.32	1.024	1.72	0.033	OR	AD outcome: flexural chronic itchy rash
Miyashita et al., 2015	43	Cross-sectional	children and adolescents	Japan	Male vs. Female	0.88	0.78	1.00	<0.05	OR	
Song et al., 2014	52	Cross-sectional	children and adolescents	China	Male vs. Female	1.2	1.1	1.3	<0.01	OR	AD outcome: lifetime AD
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Male vs. Female (Shanghai)	0.7	0.5	0.9	-	OR	
Cakir et al., 2010	80	Cross-sectional	adolescents	Turkey	Male vs. Female [#]	0.129	0.038	0.442	0.001	OR	
Wen et al., 2009	176	Birth cohort	children	Taiwan	Male vs. Female	1.44	1.28	1.61	<0.001	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Male vs. Female [#]	1.266	1.124	1.429	-	OR	
Graif et al., 2004	118	Cross-sectional	adolescents	Israel	Male vs. Female [#]	0.667	0.556	0.833	-	OR	AD outcome: chronic flexural itchy rash
Hikino et al., 2001	180	Birth cohort	children	Japan	Male vs. Female	1.48	1.01	2.16	-	OR	AD outcome: At 3 years-old
Ethnicity											
Loo et al., 2015	158	Birth cohort	children	Singapore	Indian vs. Chinese	0.14	0.03	0.65	0.01	OR	
Graif et al., 2004	118	Cross-sectional	Adolescents	Israel	Jews vs. Arab	1.70	1.40	2.00	-	OR	AD outcome: chronic flexural itchy rash
					Jews vs. Arab	1.82	1.40	2.33	-	OR	AD outcome: lifetime chronic itchy rash
Goh et al., 1996	139	Cross-sectional	children and adolescents	Singapore	Indian vs. Chinese	1.12	1.01	1.23	<0.05	OR	AD outcome: lifetime chronic rash
Number of siblings											
Lin et al., 2019	142	Birth cohort	children	Taiwan	Number of siblings: 1 vs. 0	0.75	0.73	0.77	-	OR	Supplementary data
					Number of siblings: ≥ 2 vs. 0	0.59	0.55	0.64	-	OR	Supplementary data
Cai et al., 2017	19	Cross-sectional	children	China	Number of children in current residence: ≥ 2 vs. 1 [#]	0.813	0.690	0.952	-	OR	AD outcome: lifetime AD; Children defined as ≤ 8 years-old.

					Number of children in current residence: ≥ 2 vs. 1 #	0.746	0.606	0.909	-	OR	AD outcome: current AD; Children defined as ≤ 8 years old.
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Has siblings: Yes vs. No (singletons born with normal birthweight and mother without diseases during pregnancy only) #	0.769	0.730	0.806	<0.001	OR	Normal birthweight defined as 2500-4000g.
Wang et al., 2016	154	Birth cohort	children	Taiwan	Number of siblings: >1 vs. ≤ 1 #	0.719	0.599	0.855	<0.001	OR	AD outcome: physician-diagnosed AD
Loo et al., 2015	158	Birth cohort	children	Singapore	Has siblings: Yes vs. No	0.46	0.22	0.95	0.04	OR	
Ohfuji et al., 2009	92	Cross-sectional	children and adolescents	Japan	Number of siblings: 1 vs. 0	0.78	0.66	0.94		OR	
					Number of siblings: 2 vs. 0	0.70	0.58	0.84		OR	
					Number of siblings: ≥ 3 vs. 0	0.60	0.49	0.74		OR	
					Number of siblings: 2 vs 0 (6-10 years-old only)	0.70	0.55	0.88		OR	
					Number of siblings: ≥ 3 vs. 0 (6-10 years-old only)	0.54	0.41	0.71		OR	
					Number of siblings: 1 vs. 0 (11-15 years-old only)	0.73	0.55	0.98		OR	
					Number of siblings: 2 vs. 0 (11-15 years-old only)	0.70	0.53	0.93		OR	
					Number of siblings: ≥ 3 vs. 0 (11-15 years-old only)	0.67	0.50	0.92		OR	
					Number of siblings: 1 vs. 0 (individuals with parental atopic diseases only)	0.77	0.61	0.97		OR	
					Number of siblings: 2 vs. 0 (individuals with parental atopic diseases only)	0.73	0.58	0.91		OR	
					Number of siblings: 3+ vs. 0 (individuals with parental atopic diseases only)	0.58	0.45	0.76		OR	
					Number of siblings: 2 vs. 0 (individuals without parental atopic diseases only)	0.68	0.51	0.92		OR	
					Number of siblings: 3+ vs. 0 (individuals without parental atopic diseases only)	0.65	0.47	0.90		OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Number of siblings: ≥ 2 vs. 0	0.78	0.63	0.96		OR	
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	≥ 2 siblings	0.67	0.57	0.80	<0.01	OR	
Older siblings											
Ho et al., 2019	5	Cross-sectional	children	Taiwan	Has older siblings: Yes vs. No	0.83	0.76	0.92	<0.001	OR	

Ohfuji et al., 2009	92	Cross-sectional	children and adolescents	Japan	Number of older siblings: ≥ 2 vs. 0	0.82	0.71	0.96		OR	
Younger siblings											
Ohfuji et al., 2009	92	Cross-sectional	children and adolescents	Japan	Number of younger siblings: ≥ 2 vs. 0	0.80	0.68	0.93		OR	
Household size											
Civelek et al., 2011	70	Cross-sectional	children	Turkey	Number of household members (first year of life) (continuous)	1.09	1.03	1.15	0.005	OR	AD outcome: current chronic flexural itchy rash
					Number of household members (past one year) (continuous)	1.17	1.08	1.27	<0.001	OR	AD outcome: flexural dermatitis
Maternal age (at child's birth)											
Lin et al., 2019	142	Birth cohort	children	Taiwan	≥ 35 vs. <35 years-old	1.11	1.07	1.15	-	OR	
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	25-34 vs. ≤ 24 years-old	1.92	1.03	3.56	-	OR	
Responder of questionnaire											
Altuğ et al., 2013	55	Cross-sectional	children and adolescents	Turkey	Mother vs. Father	2.13	1.25	3.63	-	OR	AD outcome: current chronic itchy rash
Socioeconomic status											
Personal occupation											
Wang et al., 2019	9	Cross-sectional	adults	China	White-collar worker vs. not occupationally active	1.32	1.13	1.53	<0.001	OR	AD outcome is for parents; White-collar worker was defined as office staff, teacher, medical staff, student, shop assistant and other occupations.
Cakir et al., 2010	80	Cross-sectional	adolescents	Turkey	Hairdressing industry vs. Student	5.33	1.40	20.25	0.014	OR	
Maternal occupation (during pregnancy)											
Cai et al., 2017	19	Cross-sectional	children	China	Employed vs. Unemployed	1.33	1.21	1.45	-	OR	Lifetime AD
					Employed vs. Unemployed	1.46	1.30	1.64	-	OR	Current AD
Wang et al., 2013	164	Birth cohort	children	Taiwan	Employed vs. Unemployed	1.18	1.05	1.33	<0.01	OR	AD outcome: chronic flexural itchy rash
					Employed vs. Unemployed	1.38	1.25	1.53	<0.001	OR	AD outcome: physician-diagnosed AD
					Professional, technical vs. Unemployed	1.34	1.13	1.60	<0.01	OR	AD outcome: chronic flexural itchy rash
					Administrative, managerial vs. Unemployed	1.32	1.07	1.63	<0.01	OR	AD outcome: chronic flexural itchy rash
					Superintendents, clerical vs. Unemployed	1.26	1.09	1.45	<0.01	OR	AD outcome: chronic flexural itchy rash
					Professional, technical vs. Not employed	1.64	1.42	1.90	<0.001	OR	AD outcome: physician-diagnosed AD
					Administrative, managerial vs. Not employed	1.52	1.27	1.81	<0.001	OR	AD outcome: physician-diagnosed AD
					Superintendents, clerical vs. Not employed	1.59	1.42	1.79	<0.001	OR	AD outcome: physician-diagnosed AD

					Manufacturing, construction, mining vs. Not employed	1.19	1.03	1.37	<0.05	OR	AD outcome: physician-diagnosed AD
					Wholesale and retail trade vs. Not employed	1.42	1.24	1.63	<0.001	OR	AD outcome: physician-diagnosed AD
					Professional, technical vs. Others (no work stress mothers only)	3.05	1.83	5.34	<0.001	OR	AD outcome: chronic flexural itchy rash or physician-diagnosed AD
					Administrative, managerial vs. Others (only mothers who reported no work stress)	2.21	1.27	3.96	<0.01	OR	AD outcome: Chronic flexural itchy rash or physician-diagnosed AD
					Superintendents, clerical vs. Others (only mothers who reported no work stress)	2.34	1.47	3.93	<0.001	OR	AD outcome: chronic flexural itchy rash or physician-diagnosed AD
					Professional, technical vs. Others (only mothers who reported work stress)	2.08	1.48	3.01	<0.001	OR	AD outcome: chronic flexural itchy rash or physician-diagnosed AD
					Administrative, managerial vs. Others (only mothers who reported work-stress)	1.96	1.37	2.89	<0.001	OR	AD outcome: chronic flexural itchy rash or physician-diagnosed AD
					Superintendents, clerical vs. Others (only mothers who reported work-stress)	2.05	1.48	2.94	<0.001	OR	AD outcome: chronic flexural itchy rash or physician-diagnosed AD
					Professional service vs. Unemployed	1.31	1.12	1.54	<0.01	OR	AD outcome: chronic flexural itchy rash
					Professional service vs. Unemployed	1.64	1.44	1.87	<0.001	OR	AD outcome: physician-diagnosed AD
					Public administration and defence vs. Unemployed	1.72	1.27	2.28	<0.001	OR	AD outcome: physician-diagnosed AD
					Others vs. Unemployed	1.41	0.99	1.95	<0.05	OR	AD outcome: physician-diagnosed AD
Family income											
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Middle vs. Low	1.90	1.03	3.49	-	OR	
					High vs. Low	1.97	1.07	3.61	-	OR	
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	High vs. Low [#]	0.781	0.690	0.885	-	OR	
Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Family affluence scale: High vs. Low	1.07	1.01	1.12	-	OR	
Wang et al., 2016	154	Birth cohort	children	Taiwan	High vs. Low	1.54	1.34	1.77	<0.001	OR	AD outcome: chronic, recurrent itchy rash
					High vs. Low	1.77	1.57	1.99	<0.001	OR	AD outcome: physician-diagnosed AD
Torfi et al., 2015	46	Cross-sectional	children and adolescents	Iran	Middle vs. Low	1.62	1.04	2.51	<0.05	OR	
					High vs. Low	2.18	1.36	3.48	<0.05	OR	
Wang et al., 2006	179	Birth cohort	children	Taiwan	>100,000 NT\$ vs. <400,000 NT\$	1.66	1.00	2.77	<0.05	OR	
Goh et al., 1996	139	Cross-sectional	children and adolescents	Singapore	>S\$4000 vs. <S\$1000	1.17	1.01	1.36	<0.05	OR	AD outcome: ever had AD

Maternal education level											
Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Bachelor or higher vs. Less	1.16	1.04	1.29	<0.05	OR	
Wang et al., 2016	154	Birth cohort	children	Taiwan	Years of education: >12 vs. ≤12 years	1.67	1.47	1.91	<0.001	OR	AD outcome: chronic flexural itchy rash
					Years of education: >12 vs. ≤12 years	1.91	1.70	2.14	<0.001	OR	AD outcome: physician-diagnosed AD
Li et al., 2011	76	Cross-sectional	children and adolescents	China	High school graduate and above vs. lower level	1.3	1.2	1.6	-	OR	
					High school graduate and above vs. lower level (Shanghai)	1.5	1.1	1.9	-	OR	
					High school graduate and above vs. lower level (Guangzhou)	1.6	1.1	2.2	-	OR	
					High school graduate and above vs. lower level (Harbin)	1.5	1.1	2.1	-	OR	
					High school graduate and above vs. lower level (Urumqi)	2.0	1.3	3.0	-	OR	
Wen et al., 2009	176	Birth cohort	children	Taiwan	High vs. Low	1.78	1.36	2.35	<0.001	OR	
					Middle vs. Low	1.52	1.19	1.98	<0.01	OR	
Wang et al., 2006	179	Birth cohort	children	Taiwan	≥University vs. ≤Junior high school	1.71	1.56	6.97	<0.05	OR	
Paternal education level											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	High school graduate and above vs. lower level (Hohhot)	2.1	1.4	3.2	-	OR	
Miyake et al., 2012	166	Birth cohort	children	Japan	Years of education: ≥15 vs. <13 years	1.89	1.07	3.42	-	OR	
Parental education level											
Lee et al., 2012	64	Cross-sectional	children and adolescents	Hong Kong	Tertiary vs. No/primary	2.27	1.66	3.10	-	OR	
Wen et al., 2009	176	Birth cohort	children	Taiwan	High vs. Low	1.33	1.05	1.69	<0.05	OR	
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	Years of education: >12 vs. <9 years (male only)	1.49	1.37	1.63	<0.01	OR	AD outcome: chronic itchy rash
					Years of education: 9-11 vs. <9 years (male only)	1.17	1.07	1.28	<0.05	OR	AD outcome: chronic flexural itchy rash
					Years of education: >12 vs. <9 years (male only)	1.73	1.56	1.92	<0.01	OR	AD outcome: chronic flexural itchy rash
					Years of education: >12 vs. <9 years (female only)	1.39	1.27	1.52	<0.01	OR	AD outcome: chronic itchy rash
					Years of education: 9-11 vs. <9 years (female only)	1.13	1.03	1.23	<0.05	OR	AD outcome: chronic flexural itchy rash
					Years of education: >12 vs. <9 years (female only)	1.52	1.37	1.69	<0.01	OR	AD outcome: chronic flexural itchy rash
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Years of education: ≥12 vs. <9 years	1.88	1.57	2.28	-	OR	

Lee et al., 2007	107	Cross-sectional	adolescents	Taiwan	Years of education: 9-11 vs. <6 years (males in 1995-1996 study only)	1.3	1.0	1.7	<0.05	OR	
					Years of education: ≥12 vs. <6 years (males in 1995-1996 study only)	1.6	1.2	2.1	<0.01	OR	
					Years of education: 9-11 vs. <6 years (females in 1995-1996 study only)	1.3	1.0	1.7	<0.05	OR	
					Years of education: ≥12 vs. <6 years (females in 1995-1996 study only)	1.8	1.2	2.3	<0.01	OR	
					Years of education: 6-8 vs. <6 years (females in 2001 study only)	2.8	1.3	6.7	<0.05	OR	
					Years of education: 9-11 vs. <6 years (females in 2001 study only)	3.1	1.5	7.4	<0.01	OR	
					Years of education: ≥12 vs. <6 years (females in 2001 study only)	2.6	1.2	6.4	<0.05	OR	
Housing type and ownership											
Cai et al., 2017	19	Cross-sectional	children	China	Type of current residence: Multi-store apartment dwellings vs. Detached housings for single families	1.18	1.03	1.35	-	OR	AD outcome: current AD
					Current house size: ≥101 vs. ≤60m2	1.17	1.02	1.34	-	OR	AD outcome: current AD
					Owner vs. Tenant	1.19	1.06	1.34	-	OR	AD outcome: current AD
School type											
Musharrafieh et al., 2009	91	Cross-sectional	adolescents	Lebanon	Private vs. Public	1.3	1.0	1.7	-	OR	

ORs and 95% CI has been converted so that the direction of the comparison and reference groups matches the other entries.

***Mixed: study investigated a mixed of children, adolescents, and adults.**

Supplemental Table 2: Significant estimates of personal medical history

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimate (OR, HR, PR, RR)	Remarks
Foetal growth											
Almakoshi et al., 2015	156	Birth cohort	children	Saudi Arabia	Quartile of change in estimated foetal weight between the 2nd and 3rd trimesters: Quartile with most growth acceleration vs. most faltering growth	<1.00 (results presented on a graph, please refer to the publication)			OR		
					Quartile of change in estimated foetal weight between the 2nd and 3rd trimesters: Quartile with least growth acceleration vs. most faltering growth	<1.00 (results presented on a graph, please refer to the publication)			OR		
					Quartile of change in estimated foetal weight between the 2nd and 3rd trimesters: Quartile with least faltering growth vs. most faltering growth	<1.00 (results presented on a graph, please refer to the publication)			OR		
Preterm birth											
Guo et al., 2016	27	Cross-sectional	children	China	Preterm birth: Yes vs. No	1.334	1.124	1.584	0.001	OR	
Birth size											
Lin et al., 2015	42	Cross-sectional	adolescents	Taiwan	Small for gestational age vs. average for gestational age	1.02	0.94	1.12	-	OR	
					Large for gestational age vs. average for gestational age	0.96	0.87	1.05	-	OR	
Birthweight											
Lin et al., 2019	142	Birth cohort	children	Taiwan	<2500 vs. ≥2500g	0.93	0.88	0.99	-	OR	
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	<2500 vs. ≥2500g	5.12	1.92	13.64	-	OR	
					<2500g vs. 2500-4000g	5.31	2.00	14.12	-	OR	
Singh et al., 2018	17	Cross-sectional	children	India	Low birthweight (6 to 7 years old only)	0.7	0.6	0.8	0.0001	OR	
Civelek et al., 2011	70	Cross-sectional	children	Turkey	<2500 vs. ≥2500g	1.79	1.08	2.94	0.024	OR	AD outcome: flexural dermatitis
Hikino et al., 2001	180	Birth cohort	children	Japan	<2500 vs. ≥2500g	0.59	0.37	0.96	-	OR	AD outcome at 18 months-old
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	>2500 vs. ≤2500g	1.23	1.01	1.41	<0.01	OR	
Atopic diseases											
Asthma											

Ho et al., 2019	5	Cross-sectional	children	Taiwan	Yes vs. No	2.18	2.01	2.36	<0.001	OR	
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.88	1.80	1.97	-	OR	
Civelek et al., 2011	70	Cross-sectional	children	Turkey	Yes (current wheezing) vs. No	2.10	1.58	2.79	<0.001	OR	AD outcome: current chronic flexural itchy rash
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Yes vs. No	2.7	2.2	3.4	-	OR	
					Yes vs. No (Shanghai)	3.1	2.2	4.6	-	OR	
					Yes vs. No (Guangzhou)	2.7	1.4	5.1	-	OR	
					Yes vs. No (Xian)	4.0	1.0	15.6	-	OR	
					Yes vs. No (Chengdu)	2.4	1.3	4.4	-	OR	
					Yes vs. No (Harbin)	3.5	1.5	7.9	-	OR	
					Yes vs. No (Hohhot)	6.9	2.4	2.0	-	OR	
				Yes vs. No (Urumqi)	3.9	1.6	9.6	-	OR		
Lee & Kim, 2011	72	Cross-sectional	Adults (≥18 years-old residents)	South Korea	Yes vs. No	2.04	1.09	3.80	<0.05	OR	
Hwang et al., 2010	82	Cross-sectional	Mixed	Taiwan	Yes vs. No	2.38	2.33	2.42		OR	
Musharrafieh et al., 2009	91	Cross-sectional	adolescents	Lebanon	Yes (AS symptoms) vs. No	2.5	2.0	3.1	-	OR	
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	Yes vs. No (male only)	2.18	1.99	2.40	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (male only)	2.42	2.18	2.68	<0.01	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No (female only)	2.39	2.15	2.66	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (female only)	2.71	2.40	3.05	<0.01	OR	AD outcome: chronic flexural itchy rash
Al-Sahab et al., 2008	94	Cross-sectional	children	Lebanon	Yes vs. No	1.64	1.16	2.32	-	OR	
Ergin et al., 2008	96	Cross-sectional	children and adolescents	Turkey	Yes vs. No	11.03	5.80	20.88		OR	
Yuksel et al., 2008	104	Cross-sectional	children and adolescents	Turkey	Yes vs. No	2.41	1.07	5.39	0.03	OR	
Graif et al., 2004	118	Cross-sectional	adolescents	Israel	Yes vs. No	2.30	1.80	2.90	-	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No	2.77	2.17	3.52	-	OR	AD outcome: chronic itchy rash
Allergic rhinitis											
Ho et al., 2019	5	Cross-sectional	children	Taiwan	Yes vs. No	3.02	2.75	3.31	<0.001	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Yes vs. No	1.8	1.5	2.1	-	OR	
					Yes vs. No (Shanghai)	1.5	1.1	2.1	-	OR	
					Yes vs. No (Guangzhou)	1.9	1.3	2.8	-	OR	
					Yes vs. No (Wuhan)	2.1	1.2	3.7	-	OR	
					Yes vs. No (Chengdu)	2.4	1.5	3.9	-	OR	
					Yes vs. No (Harbin)	2.1	1.1	3.8	-	OR	
				Yes vs. No (Hohhot)	3.2	1.8	5.7	-	OR		

Lee & Kim, 2011	72	Cross-sectional	Adults (≥18 years-old residents)	South Korea	Yes vs. No	2.18	1.46	3.26	<0.05	OR	
Hwang et al., 2010	82	Cross-sectional	Mixed	Taiwan	Yes vs. No	2.28	2.25	2.32		OR	
Musharrafieh et al., 2009	91	Cross-sectional	adolescents	Lebanon	Yes vs. No	2.8	2.3	3.4	-	OR	AR in the past year
Al-Sahab et al., 2008	94	Cross-sectional	children	Lebanon	Yes (AR) vs. No	1.35	1.07	1.70	-	OR	Ever AR
					Yes (Hay fever) vs. No	2.77	2.12	3.62	-	OR	
Ergin et al., 2008	96	Cross-sectional	children and adolescents	Turkey	Yes vs. No	25.37	13.15	49.98		OR	
Yuksel et al., 2008	104	Cross-sectional	children and adolescents	Turkey	Yes vs. No	4.26	2.06	8.79	<0.01	OR	
Allergic conjunctivitis											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.36	1.31	1.42	-	OR	
Civelek et al., 2011	70	Cross-sectional	children	Turkey	Yes vs. No	2.53	1.99	3.21	<0.001	OR	AD outcome: current chronic flexural itchy rash
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	Yes vs. No (male only)	1.93	1.80	2.06	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (male only)	2.10	1.94	2.27	<0.01	OR	AD outcome: current chronic flexural itchy rash
					Yes vs. No (female only)	2.30	2.14	2.47	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (female only)	2.40	2.21	2.61	<0.01	OR	AD outcome: current chronic flexural itchy rash
Food allergy											
Xu et al., 2016	37	Cross-sectional	children	China	Yes vs. No	3.40	2.63	4.40	<0.001	OR	
					Yes vs. No (individuals without family atopic diseases only)	4.44	3.05	6.47	<0.001	OR	
					Yes vs. No (individuals with family atopic diseases only)	2.73	1.93	3.97	<0.001	OR	
Doğruel et al., 2016	150	Birth cohort	children	Turkey	Yes vs. No	13.7	3.07	61.0	0.001	OR	
Hikino et al., 2001	180	Birth cohort	children	Japan	Yes vs. No	8.63	5.86	12.7	-	OR	AD outcome: AD at 3 years-old
Specific food allergy and serum IgE sensitisation											
Kurosaka et al., 2011	74	Cross-sectional	Children	Japan	Egg allergy	4.71	3.52	6.29	<0.001	OR	
					Cow's milk allergy	2.45	1.39	4.32	0.002	OR	
					Buckwheat allergy	1.94	1.06	3.55	0.031	OR	
					Crab allergy	2.07	1.24	3.47	0.006	OR	
Lin et al., 2016	30	Cross-sectional	children	Taiwan	Egg white sensitisation to serum IgE	1.28	1.03	1.58	<0.05	OR	
					Ovalbumin sensitisation to serum IgE	1.30	1.04	1.62	<0.05	OR	
Obesity											

Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Obesity: Yes vs. No	1.13	1.06	1.20	<0.05	OR	Obesity was defined if BMI was ≥ 25, or exceeded the 95th percentile of sex-specific and age-specific BMI in the 2007 Korea National Growth Chart
Lin et al., 2015	42	Cross-sectional	adolescents	Taiwan	BMI: 21-23 vs. 17-21	1.19	1.11	1.29	-	OR	BMI: Body Mass Index
					BMI: ≥23 vs. 17-21	1.41	1.32	1.51	-	OR	BMI: Body Mass Index
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Diagnosed obesity: Yes vs. No	1.5	1.0	2.3	-	OR	
					Diagnosed obesity: Yes vs. No (Shanghai)	2.0	1.1	3.7	-	OR	
Hamid et al., 2015	39	Cross-sectional	children	Indonesia	BMI (continuous)	1.38	1.06	1.78	<0.05	OR	BMI: Body Mass Index
Kusunoki et al., 2008	97	Cross-sectional	children and adolescents	Japan	BMI (continuous)	1.02	1	1.04	0.03	OR	BMI: Body Mass Index
Parasitic infection											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.32	1.15	1.51	-	OR	
Respiratory infections											
Bronchiolitis											
Ho et al., 2019	5	Cross-sectional	children	Taiwan	Yes vs. No	1.47	1.33	1.63	<0.001	OR	
Common cold											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	>5 vs. ≤5 times per year	1.8	1.5	2.1	-	OR	
					>5 vs. ≤5 times per year (Shanghai)	2.0	1.5	2.7	-	OR	
					>5 vs. ≤5 times per year (Xian)	3.7	2.0	6.9	-	OR	
					>5 vs. ≤5 times per year (Wuhan)	2.4	1.5	3.7	-	OR	
					>5 vs. ≤5 times per year (Harbin)	2.8	1.9	4.1	-	OR	
					>5 vs. ≤5 times per year (Hohhot)	1.8	1.1	3.1	-	OR	
					>5 vs. ≤5 times per year (Urumqi)	3.0	1.9	4.5	-	OR	
Recurrent otitis media											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Yes vs. No	1.9	1.5	2.4	-	OR	
					Yes vs. No (Shanghai)	2.2	1.4	3.6	-	OR	
					Yes vs. No (Chengdu)	2.1	1.1	4.0	-	OR	
					Yes vs. No (Urumqi)	3.6	1.6	7.9	-	OR	
Waked & Salameh, 2009	93	Cross-sectional	children and adolescents	Lebanon	Yes vs. No	2.04	1.68	2.48	<10^-4	OR	
Pertussis											
Waked & Salameh, 2009	93	Cross-sectional	children and adolescents	Lebanon	Yes vs. No	1.65	1.12	2.44	0.01	OR	
Respiratory tract infection											
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	≥4 times respiratory tract infection in last 12 months	1.81	1.60	2.05	<0.01	OR	
Autoimmune disorders											
Ankylosing spondylitis											

Woon et al., 2013	181	Cross-sectional	mixed	Taiwan	Yes vs. No	1.22	1.05	1.43	<0.05	HR	
Childhood type 1 diabetes mellitus											
Lin et al., 2016	182	Prospective	Children and adolescents	Taiwan	Yes vs. No	1.76	1.29	2.39	<0.001	HR	
Irritable bowel syndrome											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.20	1.08	1.33	-	OR	
Psoriasis											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	2.36	2.12	2.62	-	OR	
Systemic lupus erythematosus											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.91	1.35	2.72	-	OR	
Wu et al., 2014	53	Cross-sectional	mixed	Taiwan	Yes vs. No	1.94	1.48	2.54	-	OR	
					Yes vs. No (female only)	2.05	1.53	2.76	-	OR	
					Yes vs. No	3.02	1.30	7.03	-	OR	AD outcome: AD at ≤18 years old
					Yes vs. No (female only)	3.94	1.52	10.23	-	OR	AD outcome: AD at ≤18 years old
					Yes vs. No (female only)	1.76	1.28	2.41	-	OR	AD outcome: AD at >18 years old
Thyroid diseases											
Wu et al., 2014	53	Cross-sectional	mixed	Taiwan	Yes vs. No	1.68	1.26	2.24	-	OR	AD outcome: AD at >18 years old
					Yes vs. No (male only)	1.73	1.06	2.82	-	OR	
Urticaria											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.20	1.08	1.33	-	OR	
Vitiligo											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Yes vs. No	1.99	1.08	3.66	-	OR	
Psychological well-being											
Attention Deficit Hyperactivity Disorder (ADHD)											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Diagnosed ADHD: Yes vs. No	1.5	1.2	2.0	-	OR	
					Diagnosed ADHD: Yes vs. No (Wuhan)	2.2	1.2	3.9	-	OR	
					Diagnosed ADHD: Yes vs. No (Chengdu)	2.7	1.4	5.3	-	OR	
Lin et al., 2016	31	Cross-sectional	children	Taiwan	Questionnaire-based ADHD: Yes vs. No	1.66	1.23	2.25	<0.05	OR	AD outcome: lifetime AD
					Questionnaire-based ADHD: Yes vs. No	1.57	1.30	1.89	<0.05	OR	AD outcome: Current AD

					Questionnaire-based hyperactive-impulsive ADHD: Yes vs. No symptoms	1.48	1.02	2.14	<0.05	OR	AD outcome: lifetime AD
					Questionnaire-based hyperactive-impulsive ADHD: Yes vs. No symptoms	1.40	1.11	1.77	<0.05	OR	AD outcome: Current AD
					Questionnaire-based inattentive ADHD: Yes vs. No symptoms	2.19	1.44	3.32	<0.05	OR	AD outcome: lifetime AD
					Questionnaire-based inattentive ADHD: Yes vs. No symptoms	1.82	1.38	2.39	<0.05	OR	AD outcome: Current AD
					Questionnaire-based hyperactive-impulsive and inattentive ADHD: Yes vs. No symptoms	1.64	1.18	2.28	<0.05	OR	AD outcome: Current AD
Anxiety											
Kim et al., 2015	40	Cross-sectional	Adult (military conscripts)	South Korea	Anxiety: Yes vs. No	1.88	1.58	2.23	<0.001	OR	
Depression											
Kim et al., 2015	40	Cross-sectional	Adult (military conscripts)	South Korea	Depression: Yes vs. No	2.07	1.75	2.45	<0.001	OR	
Neurosis and psychosis											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	Neurosis vs. No mental disorder	1.31	1.24	1.39	-	OR	
					Psychosis and neurosis vs. No mental disorders	1.53	1.29	1.81	-	OR	
Oppositional defiant disorder											
Lin et al., 2016	31	Cross-sectional	children	Taiwan	Questionnaire-based oppositional defiant disorder symptoms: Yes vs. No	1.75	1.08	2.72	<0.05	OR	AD outcome: lifetime AD
					Questionnaire-based oppositional defiant disorder symptoms: Yes vs. No	1.78	1.35	2.34	<0.05	OR	AD outcome: Current AD
Somatisation											
Kim et al., 2015	40	Cross-sectional	Adult (military conscripts)	South Korea	Somatisation: Yes vs. No	2.09	1.78	2.45	<0.001	OR	
Work/Study/Social stress											
Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Subjective academic achievement: Middle-low vs. Low	1.09	1.01	1.17	<0.05	OR	
					Subjective academic achievement: High-middle vs. Low	1.15	1.07	1.24	<0.05	OR	
					Subjective academic achievement: High vs. Low	1.18	1.09	1.29	<0.05	OR	
Miyashita et al., 2015	43	Cross-sectional	children and adolescents	Japan	Difficulties in daily and social life: "Abnormal"/Clinical range on SDQ vs. No	1.75	1.49	2.05	<0.001	OR	The SDQ is a brief questionnaire composed of 25 items designed to investigate difficulties in the daily and social lives of children (Goodman 1997). An SDQ total difficulties score of 16 points or

											more was considered as the abnormal or “clinical” range.
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Overburden schoolwork: Yes vs. No (Urumqi)	2.0	1.3	3.0	-	OR	
Sleep-related conditions											
Obstructive sleep apnea											
Tien et al., 2014	183	Cross-sectional	mixed	Taiwan	Yes vs. No	1.50	1.15	1.95	0.0025	HR	
Sleep-disordered breathing											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Yes vs. No	1.5	1.1	2.0	-	OR	
					Yes vs. No (Shanghai)	1.8	1.0	3.3	-	OR	
Snoring											
Wang et al., 2017	148	Cross-sectional	children	China	More than once in the past 2 weeks vs. Never	1.83	1.03	3.23	<0.05	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	More than once in the past 2 weeks vs. Never (Guangzhou)	1.6	1.1	2.3	-	OR	
Other conditions											
Febrile episode/fever after vaccinations											
Wong et al., 2016	155	Cross-sectional	children	Singapore	Per febrile episode in 0-6 months	0.657	0.439	0.985	<0.05	OR	AD outcome: AD at 18 months-old
					Presence of fever in 0-6 months	0.522	0.300	0.907	<0.05	OR	AD outcome: AD at 18 months-old
					Presence of fever in 0-6 months	0.495	0.252	0.970	<0.05	OR	AD outcome: skin prick test-negative AD at 18 months-old
					Presence of fever in 0-6 months	0.430	0.191	0.970	<0.05	OR	AD outcome: skin prick test-positive AD at 36 months-old
History of hospitalisation											
Miyashita et al., 2015	43	Cross-sectional	children and adolescents	Japan	Yes vs. No	1.16	1.01	1.32	<0.05	OR	
Insect sting reaction											
Graif et al., 2009	86	Cross-sectional	adolescents	Israel	Large local reaction vs. None	2.0	1.5	2.4	<0.001	OR	
					Mild systemic reaction vs. None	2.3	1.6	3.1	<0.001	OR	
					Severe systemic reaction vs. None	1.8	1.1	2.8	0.006	OR	
Impetigo											
Hayashida et al., 2010	81	Cross-sectional	children	Japan	Yes vs. No	1.8	1.16	2.81	<0.01	OR	
Infant gastroesophageal reflux											
Waked & Salameh, 2009	93	Cross-sectional	children and adolescents	Lebanon	Yes vs. No	1.72	1.35	2.20	<10^-4	OR	
Perinatal and postnatal problems											
Lee et al., 2012	64	Cross-sectional	children and adolescents	Hong Kong	Yes vs. No	2.00	1.67	2.38	-	OR	

***Mixed: study investigated a mixed of children, adolescents, and adults.**

Supplemental Table 3: Significant estimates of family medical history

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, PR, RR)	Remarks
Atopic diseases											
Maternal history of asthma											
Lin et al., 2019	142	Birth cohort	children	Taiwan	Yes vs. No	1.31	1.22	1.4	-	OR	
Wen et al., 2009	176	Birth cohort	children	Taiwan	Yes vs. No	1.71	1.18	2.41	<0.05	OR	
Maternal history of allergic rhinitis											
Lin et al., 2019	142	Birth cohort	children	Taiwan	Yes vs. No	1.35	1.31	1.4	-	OR	
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Yes vs. No	2.59	1.31	5.13	-	OR	Supplementary data.
Wen et al., 2009	176	Birth cohort	children	Taiwan	Yes vs. No	1.32	1.15	1.52	<0.001	OR	
Maternal atopic dermatitis											
Lin et al., 2019	142	Birth cohort	children	Taiwan	Yes vs. No	1.62	1.51	1.75	-	OR	
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Yes vs. No	4.33	1.17	16.05	-	OR	Supplementary data.
Wang et al., 2016	154	Birth cohort	children	Taiwan	Yes vs. No	2.47	1.84	3.24	<0.001	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No	2.31	1.79	2.96	<0.001	OR	AD outcome: physician-diagnosed AD
Wang et al., 2006	179	Birth cohort	children	Taiwan	Yes vs. No	4.10	1.27	13.25	<0.05	OR	
Wen et al., 2009	176	Birth cohort	children	Taiwan	Yes vs. No	2.85	2.32	3.49	<0.001	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Yes vs. No	5.06	4.06	6.26	-	OR	
					Yes vs. No (Male-only)	5.35	4.00	7.07	-	OR	
					Yes vs. No (Female-only)	4.09	2.85	5.74	-	OR	
Maternal history of atopic diseases											
Lin et al., 2019	142	Birth cohort	children	Taiwan	1 atopic disease vs. None	1.35	1.31	1.4	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
					2 atopic diseases vs. None	1.86	1.72	2.01	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
					3 atopic diseases vs. None	2.81	2.03	3.89	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Yes vs. No	2.31	1.21	4.41	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis

Ziyab, 2017	23	Cross-sectional	Adults (university students)	Kuwait	Yes vs. No	1.62	1.05	2.49	0.028	PR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
Doğruel et al., 2016	150	Birth cohort	children	Turkey	Yes vs. No	6.28	1.03	38.30	0.046	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis, food allergy
Loo et al., 2015	158	Birth cohort	children	Singapore	Yes vs. No	3.15	1.51	6.57	<0.01	OR	
					Yes vs. No (AD from birth to 6 months-old)	20.46	2.73	153.15	<0.01	OR	
					Yes vs. No (AD from 6 to 12 months-old)	4.19	1.01	17.45	0.049	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Yes (AS or AR) vs. No	2.14	1.87	2.45	-	OR	Atopic diseases: asthma or allergic rhinitis
					Yes (AS or AR) vs. No (male-only)	1.98	1.64	2.37	-	OR	Atopic diseases: asthma or allergic rhinitis
					Yes (AS/AR) vs. No (female-only)	2.22	1.80	2.73	-	OR	Atopic diseases: asthma or allergic rhinitis
Talay et al., 2008	102	Cross-sectional	children and adolescents	Turkey	1 atopic disease vs. None	4.37	2.03	9.43	-	OR	
Agata et al., 1999	130	Cross-sectional	children and adolescents	Japan	Yes vs. No (Gifu)	2.98	1.98	4.49	<0.05	RR	
					Yes vs. No (Itoman)	3.06	1.53	6.11	<0.05	RR	
Paternal history of allergic rhinitis											
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Yes vs. No	4.83	2.10	11.08	-	OR	Supplementary data.
Wen et al., 2009	176	Birth cohort	children	Taiwan	Yes vs. No	1.50	1.32	1.72	<0.001	OR	
Paternal history of atopic dermatitis											
Wen et al., 2009	176	Birth cohort	children	Taiwan	Yes vs. No	2.94	2.36	3.63	<0.001	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Yes vs. No	5.51	4.48	6.72	-	OR	
					Yes vs. No (Male-only)	6.20	4.75	8.04	-	OR	
					Yes vs. No (Female-only)	4.38	3.12	6.03	-	OR	
Paternal history of atopic diseases											
Toizumi et al., 2019	144	Birth cohort	children	Vietnam	Yes vs. No	3.48	1.56	7.77	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
Ferrandiz-Mont et al., 2018	13	Cross-sectional	children	Indonesia	Probably/ever vs. No	4.09	1.51	11.11	-	OR	
Ziyab, 2017	23	Cross-sectional	Adult (university students)	Kuwait	Yes vs. No	1.54	1.02	2.33	0.042	PR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Yes (AS or AR) vs. No	1.81	1.58	2.07	-	OR	Atopic diseases: asthma or allergic rhinitis
					Yes (AS or AR) vs. No (male-only)	1.73	1.44	2.07	-	OR	Atopic diseases: asthma or allergic rhinitis
					Yes (AS or AR) vs. No (female-only)	1.69	1.37	2.07	-	OR	Atopic diseases: asthma or allergic rhinitis

Talay et al., 2008	102	Cross-sectional	children and adolescents	Turkey	1 atopic disease vs. None	4.40	1.77	10.94	-	OR	
					≥2 atopic diseases vs. None	3.78	1.88	7.64	-	OR	
					Father has (but mother does not have) vs. Both parents do not have	3.74	1.75	7.99	-	OR	Atopic diseases: asthma, allergic rhinitis, atopic dermatitis
Sahakyan et al., 2006	185	Case-control	children	Armenia	Yes vs. No	11.4	4.5	28.9	-	OR	
Agata et al., 1999	130	Cross-sectional	children and adolescents	Japan	Yes vs. No (Gifu)	1.84	1.11	3.06	<0.05	RR	
					Yes vs. No (Itoman)	3.95	2.00	7.80	<0.05	RR	
Parental history of asthma											
Torfi et al., 2015	46	Cross-sectional	children and adolescents	Iran	Yes vs. No	2.61	1.39	4.87	<0.05	OR	
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father and mother vs. None	2.26	1.39	3.68	0.001	OR	
Graif et al., 2004	118	Cross-sectional	adolescents	Israel	Yes vs. No	1.80	1.40	2.30	-	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No	1.79	1.36	2.34	-	OR	AD outcome: chronic itchy rash
Parental history of allergic rhinitis											
Torfi et al., 2015	46	Cross-sectional	children and adolescents	Iran	Yes vs. No	2.37	1.55	3.63	<0.001	OR	
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father or mother vs. None	1.15	1.01	1.32	0.049	OR	
Lee et al., 2004	120	Cross-sectional	children and adolescents	Singapore	Yes vs. No	3.0	1.5	6.1	-		
Parental history of atopic dermatitis											
Torfi et al., 2015	46	Cross-sectional	children and adolescents	Iran	Yes vs. No	5.20	3.58	7.58	<0.001	OR	
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father or mother vs. None	2.38	2.06	2.75	<0.001	OR	
					Father and mother vs. None	5.68	3.66	8.83	<0.001	OR	
Parental history of urticaria											
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father or mother vs. None	1.36	1.17	1.59	<0.001	OR	
					Father and mother vs. None	1.99	1.37	2.89	<0.001	OR	
Parental history of conjunctivitis											
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father or mother vs. None	1.20	1.01	1.42	0.039	OR	
					Father and mother vs. None	1.66	1.08	2.54	0.020	OR	
Parental history of atopic diseases											
Acharya et al., 2019	3	Cross-sectional	mixed	South Korea	Yes vs. No	2.3	1.09	4.9	0.028	OR	
Gao et al., 2019	141	Birth cohort	children	China	Yes vs. No	2.14	1.54	2.97	<0.001	OR	Mother or father with asthma, allergic rhinitis or atopic dermatitis
Guner et al., 2011	71	Cross-sectional	children and adolescents	Turkey	Yes vs. No	3.5	2.1	6	-	OR	Mother or father with asthma, allergic rhinitis or atopic dermatitis
Kurosaka et al., 2011	74	Cross-sectional	children	Japan	Father or mother vs. None	1.22	1.04	1.43	0.016	OR	Mother or father with asthma, allergic rhinitis or atopic dermatitis
					Father and mother vs. None	1.35	1.35	1.63	0.002	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Yes vs. No (male-only)	2.60	2.21	3.05	-	OR	Mother or father with asthma, allergic rhinitis or atopic dermatitis

					Yes vs. No (female-only)	2.63	2.19	3.16	-	OR	Mother or father with asthma, allergic rhinitis or atopic dermatitis
Talay et al., 2008	102	Cross-sectional	children and adolescents	Turkey	Both parents have vs. None	3.81	1.57	9.21	-	OR	Mother or father with asthma, allergic rhinitis, or atopic dermatitis
Lee et al., 2004	120	Cross-sectional	children and adolescents	Singapore	Yes (either parent is atopic) vs. No	3.61	1.7	7.9	-	RR	
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	Parental history of atopy	2.58	2.33	2.85	<0.01	OR	Did not state if atopy is sensitisation or atopic diseases; excluded from meta-analysis.
Agata et al., 1999	130	Cross-sectional	children and adolescents	Japan	Yes vs. No (Gifu)	4.00	2.51	6.37	<0.05	RR	
Maternal grandparent history of atopic dermatitis											
Wang et al., 2006	179	Birth cohort	children	Taiwan	Yes vs. No	4.56	1.39	15.00	<0.05	OR	
Family history of asthma											
Lee et al., 2012	64	Cross-sectional	children and adolescents	Hong Kong	Yes vs. No	2.87	2.08	3.97	-	OR	
Family history of atopic dermatitis											
Wang et al., 2006	179	Birth cohort	children	Taiwan	Yes vs. No	2.71	1.40	5.23	<0.05	OR	
Kawada et al., 2004	119	Cross-sectional	children	Japan	Yes vs. No	6.68	5.73	7.79	-	OR	
Family history of atopic diseases											
Wang et al., 2016	154	Birth cohort	children	Taiwan	Yes vs. No	1.95	1.71	2.22	<0.001	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No	2.02	1.81	2.27	<0.001	OR	AD outcome: physician-diagnosed AD
Xu et al., 2016	37	Cross-sectional	children	China	Yes vs. No	3.85	3.05	4.87	<0.001	OR	Family: parents or grandparents
Civelek et al., 2011	70	Cross-sectional	children	Turkey	Yes vs. No	1.62	1.21	2.18	0.002	OR	AD outcome: flexural dermatitis
Talay et al., 2008	102	Cross-sectional	children and adolescents	Turkey	Yes vs. No	2.33	1.17	4.65	-	OR	Family: first degree relative
Toros Selçuk et al., 1997	138	Cross-sectional	children	Turkey	Yes vs. No	6.44	3.50	11.87	-	OR	Family: mother, father siblings
Psychological well-being											
Maternal depression											
Wang et al., 2016	154	Birth cohort	children	Taiwan	Postpartum depression: Yes vs. No	1.42	1.21	1.66	<0.001	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Diagnosed pre- and post-partum: Yes vs. No	1.7	1.3	2.4	-	OR	
					Diagnosed pre- and post-partum: Yes vs. No (Guangzhou)	2.4	1.1	5.8	-	OR	
					Diagnosed pre- and post-partum: Yes vs. No (Xian)	5.9	2.4	14.6	-	OR	
					Diagnosed pre- and post-partum: Yes vs. No (Hohhot)	4.7	2.0	10.8	-	OR	

Paternal depression											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Diagnosed depression: Yes vs. No (Wuhan)	2.7	1.5	6.8	-	OR	
Maternal work schedule											
Wang et al., 2013	164	Birth cohort	children	Taiwan	Day vs. Unemployed	1.25	1.01	1.41	<0.05	OR	AD outcome: chronic flexural itchy rash
					Day vs. Unemployed	1.47	1.33	1.63	<0.05	OR	AD outcome: physician-diagnosed AD
Maternal work stress											
Wang et al., 2013	164	Birth cohort	children	Taiwan	Very high/high vs. Low/not at all (excluding unemployed)	1.43	1.20	1.70	<0.001	OR	AD outcome: chronic flexural itchy rash
					Intermediate vs. Low/not at all (excluding unemployed)	1.20	1.00	1.45	<0.05	OR	AD outcome: chronic flexural itchy rash
					Very high/high vs. Low/not at all (excluding unemployed)	1.34	1.16	1.54	<0.001	OR	AD outcome: physician-diagnosed AD
					Intermediate vs. Low/not at all (excluding unemployed)	1.22	1.05	1.41	<0.01	OR	AD outcome: physician-diagnosed AD
Other conditions											
Maternal pre-pregnancy obesity											
Goudarzi et al., 2018	146	Birth cohort	children	Japan	Maternal pre-pregnancy BMI (continuous, AD at 4 year-old)	0.96	0.93	0.99	0.015	RR	BMI: Body Mass Index
					Maternal pre-pregnancy BMI (continuous AD at 7 year-old)	0.97	0.94	0.99	0.040	RR	BMI: Body Mass Index
Maternal infections during pregnancy											
Doğruel et al., 2016	150	Birth cohort	children	Turkey	Yes vs. No	3.73	1.25	11.09	0.018	OR	
Hsieh et al., 2016	151	Birth cohort	children	Taiwan	Periodontal disease: Yes vs. No inflammatory conditions	1.14	1.12	1.17	<0.001	HR	
					Other inflammatory conditions: Yes vs. No inflammatory conditions	1.12	1.10	1.15	<0.001	HR	Inflammatory conditions: urinary tract infection, bacterial vaginosis, infections of genitourinary tract, infections of kidney, inflammatory disease of cervix, vagina
Lung diseases											
Waked & Salameh, 2009	93	Cross-sectional	children and adolescents	Lebanon	Yes vs. No	2.11	1.58	2.81	<10^-4	OR	
					Yes vs. No	1.43	1.06	1.93	0.02	OR	
Snoring											
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Paternal snoring: Yes vs. No	1.2	1.0	1.4	-	OR	
					Paternal snoring: Yes vs. No (Urumqi)	1.7	1.1	1.2	-	OR	

***Mixed: study investigated a mixed of children, adolescents, and adults.**

Supplemental Table 4: Significant estimates of medical treatments

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, PR, RR)	Remarks
Antibiotics											
During pregnancy											
Gao et al., 2019	141	Birth cohort	children	China	During pregnancy: Yes vs. no	3.59	1.19	10.85	0.024	OR	
After birth											
Gao et al., 2019	141	Birth cohort	children	China	During first year of life: Yes vs. no	0.44	0.28	0.7	<0.001	OR	
Ho et al., 2019	5	Cross-sectional	children	Taiwan	During first year of life: Yes vs. no	1.37	1.22	1.53	<0.001	OR	
Norbäck et al., 2019	7	Cross-sectional	children	China	Only during first year of life vs. Never	1.20	1.11	1.30	≤0.001	OR	
					During or/and after first year of life vs. Never	1.37	1.27	1.47	≤0.001	OR	
					During first year of life: 1 time vs. None	1.15	1.07	1.24	≤0.001	OR	
					During first year of life: >1 time vs. None	1.45	1.36	1.56	≤0.001	OR	
					Only during first year of life vs. Never (only children without lifetime pneumonia or long duration of common cold)	1.16	1.05	1.29	≤0.01	OR	
					During or/and after first year of life vs. Never (only children without lifetime pneumonia or long duration of common cold)	1.28	1.17	1.40	≤0.001	OR	
					During first year of life: >1 time vs. None (only children without lifetime pneumonia or long duration of common cold)	1.36	1.24	1.50	≤0.001	OR	
Singh et al., 2018	17	Cross-sectional	children	India	During first year of life: Yes vs. No (6-7 years-old only)	1.8	1.6	2.0	<0.0001	OR	
Cai et al., 2017	19	Cross-sectional	children	China	During first year of life: Yes vs. No	1.20	1.08	1.33	-	OR	AD outcome: lifetime AD
					During first year of life: Yes vs. No	1.25	1.11	1.41	-	OR	AD outcome: current AD
Yamamoto-Hanada et al., 2017	149	Birth cohort	children	Japan	Before 3 years old: Yes vs. No	1.40	1.01	1.94	0.44	OR	
					Macrolide use before 3 years old: Yes vs. No	1.58	1.07	2.33	0.022	OR	
Loo et al., 2015	158	Birth cohort	children	Singapore	During first 6 months of life: Yes vs. No	3.11	1.10	8.76	0.03	OR	AD outcome: AD in 12 to 18 months

Wang et al., 2013	165	Birth cohort	children	Taiwan	During first year of life: Antibiotics only (no acetaminophen) vs. No exposure to both antibiotics and acetaminophen (1998 cohort only)	1.61	1.53	1.70	-	HR	
					During first year of life: Exposure to both antibiotics and acetaminophen vs. No exposure to both antibiotics and acetaminophen (1998 cohort only)	1.98	1.89	2.07	-	HR	
Sriyaraj et al., 2008	101	Cross-sectional	children	Thailand	During first year of life: Yes vs. No	2.92	1.49	5.69	0.002	OR	AD outcome: Ever chronic rash
Sahakyan et al., 2006	185	Case-control	children	Armenia	During first year of life: Yes vs. No	2.5	1.3	5.2	-	OR	
Paracetomol											
Wang et al., 2013	165	Birth cohort	children	Taiwan	During first year of life: Acetaminophen only (no antibiotics) vs. No exposure to both antibiotics and acetaminophen (1998 cohort only)	2.02	1.92	2.13	-	HR	
Singh et al., 2018	17	Cross-sectional	children	India	During first year of life: Yes vs. No (6-7 years-old only)	1.7	1.5	2.0	<0.0001	OR	
					Current intake: Yes vs. No (6-7 years-old only)	1.4	1.2	1.6	<0.0001	OR	
					Current intake: Yes vs. No (13-14 years-old only)	0.8	0.7	0.9	<0.0001	OR	
General anaesthesia											
Kuo et al., 2016	152	Birth cohort	children	Taiwan	During first year of life: Yes vs. No	0.60	0.57	0.64	-	HR	
					During first year of life: General anaesthesia using mask vs. No exposure	0.61	0.53	0.69	-	HR	
					During first year of life: General anaesthesia using intubation vs. No exposure	0.60	0.56	0.64	-	HR	
Phototherapy & Neonate jaundice											
Bahraini et al., 2019	184	Case-control	children	Iran	Phototherapy: Yes vs. No	4.24	1.38	13.06	-	OR	
Wei et al., 2015	157	Birth cohort	children	Taiwan	Neonatal jaundice: Yes vs. No (females)	2.46	2.27	2.68	<0.001	HR	
					Neonatal jaundice: Yes vs. No (males)	2.50	2.34	2.68	<0.001	HR	
					Phototherapy: Yes vs. No (only infants with neonatal jaundice)	1.22	1.14	1.29	<0.001	HR	
Vaccination before 6 months-old											
Wang et al., 2012	167	Birth cohort	children	Taiwan	DTP-Hib & OPV vaccination vs. DTP & OPV vaccination	1.38	1.15	1.65	<0.05	OR	DTP: Diphtheriae-tetanus-pertussis; Hib: Haemophilus influenzae type b; OPV: oral poliomyelitis vaccine
Wang et al., 2012	167	Birth cohort	children	Taiwan	DTP-Hib-IPV vs. DTP & OPV vaccination	1.49	1.29	1.72	<0.05	OR	IPV: inactivated poliomyelitis vaccine

Supplemental Table 5: Significant estimates of outdoor environmental factors

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimate (OR, HR, PR, RR)	Remarks
Urbanisation											
Lin et al., 2019	142	Birth cohort	children	Taiwan	Highest vs. Lowest	1.74	1.67	1.80	-	OR	
					2nd highest vs. Lowest	1.34	1.28	1.39	-	OR	
					3rd highest vs. Lowest	1.14	1.09	1.20	-	OR	
Wang et al., 2019	9	Cross-sectional	adults	China	Urban vs. Suburban [#]	1.52	1.20	1.89	<0.001	OR	
Cai et al., 2017	19	Cross-sectional	children	China	Urban vs. Suburban	1.38	1.25	1.53	-	OR	AD outcome: Lifetime AD
					Urban vs. Suburban	1.29	1.14	1.46	-	OR	AD outcome: Current AD
Guo et al., 2016	27	Cross-sectional	children	China	Urban vs. rural [#]	11.63	9.52	14.08	<0.001	OR	
Lee et al., 2016	29	Cross-sectional	adolescents	South Korea	Small, medium cities vs. Districts	1.10	1.02	1.19	<0.05	OR	
					Large cities vs. Districts	1.10	1.02	1.19	<0.05	OR	
Xu et al., 2016	37	Cross-sectional	children	China	Yes vs. No	1.52	1.18	1.96	<0.01	OR	
					Yes vs. No (individuals without family history of atopic diseases)	1.99	1.39	2.85	<0.001	OR	
Wang et al., 2016	154	Birth cohort	children	Taiwan	Urban vs. rural	1.14	1.00	1.30	<0.001	OR	AD outcome: Chronic flexural itchy rash
					Urban vs. rural	1.49	1.33	1.67	<0.001	OR	AD outcome: Physician-diagnosed AD
Xu et al., 2012	68	Cross-sectional	children	China	City centre vs. Countryside	1.509	1.111	2.050	-	OR	
Graif et al., 2004	118	Cross-sectional	adolescents	Israel	Yes vs. No	1.42	1.14	1.77	-	OR	AD outcome: Chronic itchy rash
Residential area/city											
Acharya et al., 2019	3	Cross-sectional	Mixed	South Korea	Pohang-Si (industrialised city) vs. Yeongdeok-Gun (non-industrialised)	2.5	1.18	5.53	0.018	OR	Pohang-Si is an industrial city
Altuğ et al., 2013	55	Cross-sectional	children and adolescents	Turkey	R3 (city centre with urbanised traffic) vs. R1 (suburban region far from city centre) [#]	0.58	0.35	0.97	-	OR	AD outcome: Current chronic rash
Musharrafieh et al., 2009	91	Cross-sectional	adolescents	Lebanon	Beirut vs. Beirut suburbs [#]	1.43	1.11	2.00	-	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Chengdu vs. Urumqi	0.6	0.5	0.8	-	OR	

					Hohhot vs. Urumqi	1.3	1.0	1.7	-	OR	
Waked & Salameh, 2008	103	Cross-sectional	children	Lebanon	Beirut vs. South Lebanon [#]	1.82	1.03	3.13	0.04	OR	
Lee & Kim, 2011	72	Cross-sectional	Adults (residents ≥18 years-old)	South Korea	Living in geographical area labelled as high risk of atopic diseases	9.74	7.56	12.54	<0.05	OR	
Commercial district within 200m											
Cai et al., 2017	19	Cross-sectional	children	China	Commercial district within 200m of residence: Yes vs. No	1.16	1.05	1.28	-	OR	AD outcome: Lifetime AD
Cai et al., 2017	19	Cross-sectional	children	China	Commercial district within 200m of residence: Yes vs. No	1.19	1.05	1.34	-	OR	AD outcome: Current AD
River or lake within 200m											
Cai et al., 2017	19	Cross-sectional	children	China	Yes vs. No	1.21	1.02	1.43	-	OR	AD outcome: Current AD
Traditional Chinese Medicine physician density											
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	High vs. Moderate	1.28	1.13	1.45	-	OR	Number of physicians per 10000 people for each of the administrative units
Traffic flow											
Cai et al., 2017	19	Cross-sectional	children	China	Highway within 200m of residence: Yes vs. No	1.15	1.03	1.29	-	OR	AD outcome: Current AD
Singh et al., 2018	17	Cross-sectional	children	India	Yes vs. No (6-7 years-old only)	1.1	1.0	1.3	0.03	OR	
					Yes vs. No (13-14 years-old only)	1.3	1.2	1.5	<0.0001	OR	
Yi et al., 2017	22	Cross-sectional	children	South Korea	≤150m vs. >500m from residence	1.15	1.01	1.32	-	OR	
					150-300m vs. >500m from residence	1.17	1.03	1.34	-	OR	
					300-500m vs. >500m from residence	1.16	1.16	1.34	-	OR	
					Density of roads within 300m from residence	1.08	1.01	1.15	-	OR	For every interquartile range (13,120m ²) increase; Density of roads is defined by the sum of road lengths multiplied by numbers of lanes and road widths of major roads within a 300m radius buffer from a child's home.
Al-Sahab et al., 2008	94	Cross-sectional	children	Lebanon	Continuously during daytime vs. Never/rarely	1.48	1.11	1.97	-	OR	
Sriyaraj et al., 2008	101	Cross-sectional	children	Thailand	Frequency of truck passing residence: frequently throughout the day vs. Never	5.86	2.02	17.00	0.001	OR	AD outcome: ever chronic rash

					Frequency of truck passing residence: Almost the whole day vs. Never	4.09	1.37	12.26	0.012	OR	AD outcome: ever chronic rash
Oxides of nitrogen (NOx)											
Before pregnancy											
Lu et al., 2017	21	Cross-sectional	children	China	NO2 during 1-3 months before pregnancy (continuous)	1.24	1.00	1.53	≤0.05	OR	For per interquartile range increase
During pregnancy											
Deng et al., 2019	4	Cross-sectional	children	China	NO2 during pregnancy: ≥54.48 vs. ≤29.20µg/m^3	1.496	1.139	1.966	<0.05	OR	
Lu et al., 2017	21	Cross-sectional	children	China	NO2 entire pregnancy (continuous)	1.42	1.08	1.86	≤0.05	OR	For per interquartile range increase
					NO2 1st trimester (continuous)	1.65	1.28	2.13	≤0.001	OR	For per interquartile range increase
					NO2 2nd trimester (continuous)	1.30	1.04	1.63	≤0.05	OR	For per interquartile range increase
Liu et al., 2016	32	Cross-sectional	children	China	NO2 during pregnancy (continuous)	1.80	1.29	2.49	-	OR	AD outcome: Lifetime AD; per interquartile range increase
					NO2 during pregnancy (continuous)	2.32	1.57	3.43	-	OR	AD outcome: Current AD; per interquartile range increase
Deng et al., 2016	25	Cross-sectional	children	China	NO2 during entire pregnancy (continuous)	1.37	1.04	1.80	<0.05	OR	Per interquartile range increase
					NO2 during 1st trimester of pregnancy (continuous)	1.54	1.14	2.09	<0.01	OR	Per interquartile range increase
					NO2 during 3rd trimester of pregnancy (continuous)	0.71	0.54	0.92	<0.05	OR	Per interquartile range increase
After birth											
Norbäck et al., 2019	7	Cross-sectional	children	China	Lifetime mean NO2 (continuous)	1.16	1.01	1.35	≤0.05	OR	For 10 µg/m3 increase in lifetime NO2.
Deng et al., 2019	4	Cross-sectional	children	China	NO2 during first year of life: 29.30-54.48 vs. ≤29.20µg/m^3	1.371	1.086	1.729	<0.05	OR	
					NO2 during first year of life: ≥54.48 vs. ≤29.20µg/m^3	1.335	1.033	1.726	<0.05	OR	
Liu et al., 2016	32	Cross-sectional	children	China	NO2 during first year of life (continuous)	2.00	1.40	2.84	-	OR	AD outcome: Lifetime AD; per interquartile range increase
					NO2 during first year of life (continuous)	2.16	1.43	3.28	-	OR	AD outcome: Current AD; per interquartile range increase
					NO2 during first two years of life (continuous)	2.49	1.61	3.85	-	OR	AD outcome: Lifetime AD; per interquartile range increase
					NO2 during first two years of life (continuous)	2.63	1.57	4.40	-	OR	AD outcome: Current AD; per interquartile range increase
					NO2 during first three years of life (continuous)	1.83	1.26	2.68	-	OR	AD outcome: Lifetime AD; per interquartile range increase
					NO2 during first three years of life (continuous)	1.83	1.17	2.86	-	OR	AD outcome: Current AD; per interquartile range increase
					NO2 in total lifetime (continuous)	1.59	1.11	2.29	-	OR	AD outcome: Lifetime AD; per interquartile range increase
					NO2 in total lifetime (continuous)	1.74	1.13	2.68	-	OR	AD outcome: Current AD; per interquartile range increase

Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	NOx (females only)	1.11	1.02	1.21	<0.05	RR	AD outcome: Chronic flexural rash; Per interquartile range increase
Particulate Matter 10 (PM10)											
Deng et al., 2019	4	Cross-sectional	children	China	PM10 during pregnancy: 112.82-124.87 vs. ≤106.15µg/m^3	1.294	1.024	1.635	<0.05	OR	
					PM10 during pregnancy: ≥124.87 vs. ≤106.15µg/m^3	1.464	1.115	1.924	<0.05	OR	
					PM10 during first year of life: 112.82-124.87 vs. ≤106.15µg/m^3	1.305	1.019	1.673	<0.05	OR	
					PM10 during first year of life: ≥124.87 vs. ≤106.15µg/m^3	1.333	1.024	1.735	<0.05	OR	
Norbäck et al., 2019	7	Cross-sectional	children	China	Lifetime mean PM10 (continuous)	1.17	1.06	1.28	≤0.001	OR	For 10 µg/m3 increase in lifetime NO2.
Lu et al., 2017	21	Cross-sectional	children	China	PM10 during 4-6th month before pregnancy (continuous)	0.82	0.68	0.99	≤0.05	OR	Per interquartile range increase
Deng et al., 2016	26	Cross-sectional	children	China	PM10 before pregnancy (continuous)	0.70	0.50	0.98	<0.05	OR	Per interquartile range increase
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	PM10 (continuous) (females only)	0.87	0.78	0.97	<0.05	RR	AD outcome: Chronic itchy rash; a change in each factor by interquartile range
					PM10 (continuous) (females only)	0.79	0.70	0.89	<0.01	RR	AD outcome: Chronic flexural rash; Per interquartile range increase
PM2.5, SO2, CO, Perceived air pollution											
Deng et al., 2019	4	Cross-sectional	children	China	PM2.5 during pregnancy: 73.28-74.63 vs. ≤68.02µg/m^3	1.377	1.08	1.757	<0.05	OR	
					PM2.5 during pregnancy: ≥74.63 vs. ≤68.02µg/m^3	1.451	1.128	1.865	<0.05	OR	
					PM2.5 during first year of life: ≥74.63 vs. ≤68.02µg/m^3	1.343	1.016	1.775	<0.05	OR	
Norbäck et al., 2019	7	Cross-sectional	children	China	Lifetime mean temperature (continuous variable)	1.13	1.08	1.19	≤0.001	OR	For 1 degree Celsius increase in lifetime mean temperature
Lu et al., 2017	21	Cross-sectional	children	China	SO2 during 1st trimester (continuous)	0.79	0.65	0.95	≤0.05	OR	Per interquartile range increase
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	CO (females only) (continuous)	1.10	1.00	1.22	<0.05	RR	AD outcome: Chronic flexural itchy rash; a change in each factor by interquartile range
					Traffic-related air pollution factor (continuous) (males only)	1.09	1.00	1.19	<0.05	RR	AD outcome: Chronic flexural itchy rash; a change in each factor by interquartile range
					Traffic-related air pollution factor (continuous) (females only)	1.08	1.00	1.16	<0.05	RR	AD outcome: Chronic itchy rash; a change in each factor by interquartile range
					Traffic-related air pollution factor (continuous) (females only)	1.12	1.04	1.22	<0.05	RR	AD outcome: Chronic flexural itchy rash; a change in each factor by interquartile range

					Fossil fuel combustion-related air pollution factor (continuous) (females only)	0.89	0.82	0.97	<0.05	RR	AD outcome: Chronic itchy rash; a change in each factor by interquartile range
					Fossil fuel combustion-related air pollution factor (continuous) (females only)	0.84	0.76	0.91	<0.05	RR	AD outcome: Chronic flexural itchy rash; a change in each factor by interquartile range
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Perceived ambient air pollution level: Mild vs. No	1.22	1.06	1.40	-	OR	
					Perceived ambient air pollution level: Moderate-severe vs. No	1.56	1.23	1.97	-	OR	
					Perceived ambient air pollution (males without parental atopic diseases only)	1.32	1.02	1.72	-	OR	
Climatic environmental factors											
Metintas et al., 2010	83	Cross-sectional	children	Turkey	Mean annual temperature (female-only)	1.007	1.001	1.012	<0.05	OR	
Miyashita et al., 2015	43	Cross-sectional	children and adolescents	Japan	Costal municipalities	1.18	1.02	1.36	<0.05	OR	
Kawada et al., 2004	119	Cross-sectional	children	Japan	Living at higher altitude: 100-200m vs. 0-100m	1.38	1.16	1.64	-	OR	
					Living at higher altitude: 200-1200m vs. 0-100m	1.47	1.19	1.81	-	OR	
Water hardness											
Miyake et al., 2004	122	Cross-sectional	children	Japan	Water hardness: 54.0-75.9 vs. <48.0 mg/L	1.08	1.05	1.10	-	OR	
Miyake et al., 2004	122	Cross-sectional	children	Japan	Water hardness: +76.0 vs. <48.0 mg/L	1.12	1.06	1.18	-	OR	
Occupational exposure											
Kurt et al., 2011	73	Cross-sectional	Adults (residents ≥18 years-old)	Turkey	Chemical fume exposure due to work vs. No exposure	3.7	1.3	10.6	<0.05	OR	

ORs and 95% CI has been converted so that the direction of the comparison and reference groups matches the other entries.

*Mixed: study investigated a mixed of children, adolescents, and adults.

Supplemental Table 6: Significant estimates of indoor environmental factors

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, PR, RR)	Remarks
Home renovation											
One year before pregnancy											
Sun et al., 2019	8	Cross-sectional	children	China	Yes vs. No	1.15	1.06	1.25	0.001	OR	AD outcome: Lifetime AD
					Yes vs. No	1.14	1.03	1.26	0.014	OR	AD outcome: Current AD
					Yes vs. No (Male only)	1.16	1.04	1.29	0.008	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (Female only)	1.19	1.03	1.37	0.015	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (southern cities only)	1.11	1.02	1.22	0.023	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (high income level only)	1.17	1.07	1.28	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (High income level only)	1.12	1.01	1.26	0.039	OR	AD outcome: Current AD; Supplementary data
Cai et al., 2017	18	Cross-sectional	children	China	Yes vs. no	1.18	1.04	1.33	-	OR	AD outcome: Lifetime AD
					Yes vs. No	1.20	1.04	1.39	-	OR	AD outcome: Current AD
During pregnancy											
Sun et al., 2019	8	Cross-sectional	children	China	Yes vs. No	1.26	1.10	1.46	0.001	OR	AD outcome: Lifetime AD
					Yes vs. No	1.31	1.11	1.56	0.001	OR	AD outcome: Current AD
					Yes vs. No (Male only)	1.23	1.01	1.48	0.035	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (Female only)	1.28	1.05	1.56	0.015	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (southern cities only)	1.35	1.15	1.58	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (high income level only)	1.18	1.01	1.38	0.038	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (low income level only)	1.56	1.18	2.06	0.002	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (Male only)	1.39	1.10	1.75	0.006	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (southern cities)	1.29	1.06	1.57	0.012	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (low income level only)	1.97	1.42	2.76	<0.001	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	Yes vs. no	1.49	1.20	1.84	-	OR	AD outcome: Lifetime AD
					Yes vs. no	1.39	1.08	1.80	-	OR	AD outcome: Current AD
	34		children	China	Yes vs. No	1.41	1.03	1.93	<0.05	OR	

Xu et al., 2016		Cross-sectional			Yes vs. No (individuals without familial atopic diseases only)	2.10	1.35	3.26	<0.01	OR	
Deng et al., 2016	25	Cross-sectional	children	China	Yes vs. No	1.52	1.05	2.20	<0.05	OR	
Wen et al., 2009	158	Birth cohort	children	Taiwan	Yes vs. No	1.61	1.27	2.02	<0.001	OR	
First year of life											
Sun et al., 2019	8	Cross-sectional	children	China	Yes vs. No	1.26	1.04	1.54	0.02	OR	AD outcome: Current AD
					Yes vs. No	1.26	1.07	1.48	0.005	OR	AD outcome: Lifetime AD
					Yes vs. No (Male only)	1.25	1.01	1.55	0.037	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (southern cities only)	1.32	1.09	1.59	0.004	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (high income level only)	1.23	1.03	1.47	0.025	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (low income level only)	1.47	1.02	2.12	0.037	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	Yes vs. no	1.31	1.00	1.72	-	OR	AD outcome: Lifetime AD
After first year of life											
Sun et al., 2019	8	Cross-sectional	children	China	Yes vs. No	1.22	1.13	1.32	<0.001	OR	AD outcome: Lifetime AD
					Yes vs. No	1.28	1.16	1.41	<0.001	OR	AD outcome: Current AD
					Yes vs. No (Male only)	1.19	1.07	1.32	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (Female only)	1.24	1.11	1.39	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (southern cities)	1.19	1.09	1.30	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (nothern cities only)	1.23	1.07	1.41	0.003	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (high income level only)	1.27	1.16	1.38	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					Yes vs. No (Male only)	1.33	1.16	1.51	<0.001	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (Female only)	1.23	1.08	1.41	0.002	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (southern cities)	1.29	1.16	1.44	<0.001	OR	AD outcome: Current AD; Supplementary data.
					Yes vs. No (High income level only)	1.32	1.19	1.47	<0.001	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	Yes vs. no	1.23	1.09	1.39	-	OR	AD outcome: Lifetime AD
					Yes vs. no	1.35	1.17	1.55	-	OR	AD outcome: Current AD
Buying new furniture											
One year before pregnancy											
Sun et al., 2019	8	Cross-sectional	children	China	One year before pregnancy: Yes vs. No	1.16	1.08	1.24	<0.001	OR	AD outcome: Lifetime AD
					One year before pregnancy: Yes vs. No	1.13	1.04	1.23	0.004	OR	AD outcome: Current AD

					One year before pregnancy: Yes vs. No (Male only)	1.16	1.06	1.26	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					One year before pregnancy: Yes vs. No (Female only)	1.17	1.07	1.29	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					One year before pregnancy: Yes vs. No (Female only)	1.2	1.07	1.35	0.002	OR	AD outcome: Current AD; Supplementary data.
					One year before pregnancy: Yes vs. No (southern cities)	1.17	1.08	1.27	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					One year before pregnancy: Yes vs. No (southern cities)	1.14	1.03	1.25	0.01	OR	AD outcome: Current AD; Supplementary data.
					One year before pregnancy: Yes vs. No (high income level only)	1.22	1.13	1.31	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					One year before pregnancy: Yes vs. No (High income level only)	1.19	1.09	1.31	<0.001	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	One year before pregnancy: Yes vs. No	1.21	1.09	1.34	-	OR	AD outcome: Lifetime AD
					One year before pregnancy: Yes vs. No	1.20	1.06	1.35	-	OR	AD outcome: Current AD
Xu et al., 2016	34	Cross-sectional study	children	China	6 months before pregnancy: Yes vs. No (parents/grandparents without atopic diseases)	1.91	1.17	3.14	<0.05	OR	
During pregnancy											
Sun et al., 2019	8	Cross-sectional	children	China	During pregnancy: Yes vs. No	1.19	1.10	1.30	<0.001	OR	AD outcome: Lifetime AD
					During pregnancy: Yes vs. No	1.28	1.15	1.42	<0.001	OR	AD outcome: Current AD
					During pregnancy: Yes vs. No (Male only)	1.2	1.04	1.39	0.015	OR	AD outcome: Current AD; Supplementary data.
					During pregnancy: Yes vs. No (Female only)	1.3	1.15	1.47	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					During pregnancy: Yes vs. No (Female only)	1.34	1.15	1.55	<0.001	OR	AD outcome: Current AD; Supplementary data.
					During pregnancy: Yes vs. No (southern cities)	1.2	1.08	1.33	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					During pregnancy: Yes vs. No (southern cities)	1.22	1.08	1.39	0.002	OR	AD outcome: Current AD; Supplementary data.
					During pregnancy: Yes vs. No (northern cities only)	1.25	1.03	1.52	0.021	OR	AD outcome: Current AD; Supplementary data.
					During pregnancy: Yes vs. No (high income level only)	1.21	1.10	1.33	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					During pregnancy: Yes vs. No (High income level only)	1.222	1.09	1.38	0.001	OR	AD outcome: Current AD; Supplementary data.
					During pregnancy: Yes vs. No (low income level only)	1.39	1.12	1.75	0.003	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	During pregnancy: Yes vs. no	1.22	1.06	1.40	-	OR	AD outcome: Lifetime AD
					During pregnancy: Yes vs. no	1.26	1.07	1.48	-	OR	AD outcome: Current AD
During first year of life											
Sun et al., 2019	8	Cross-sectional	children	China	During first year of life: Yes vs. No	1.14	1.05	1.25	0.003	OR	AD outcome: Lifetime AD
					During first year of life: Yes vs. No	1.15	1.03	1.28	0.011	OR	AD outcome: Current AD

					During first year of life: Yes vs. No (Female only)	1.2	1.06	1.36	0.003	OR	AD outcome: Lifetime AD; Supplementary data
					During first year of life: Yes vs. No (Female only)	1.23	1.06	1.43	0.007	OR	AD outcome: Current AD; Supplementary data.
					During first year of life: Yes vs. No (southern cities)	1.15	1.04	1.27	0.009	OR	AD outcome: Lifetime AD; Supplementary data
					During first year of life: Yes vs. No (high income level only)	1.11	1.00	1.22	0.044	OR	AD outcome: Lifetime AD; Supplementary data
					During first year of life: Yes vs. No (High income level only)	1.13	1.00	1.27	0.049	OR	AD outcome: Current AD; Supplementary data.
After first year of life											
Sun et al., 2019	8	Cross-sectional	children	China	After first year of life: Yes vs. No	1.16	1.09	1.23	<0.001	OR	AD outcome: Lifetime AD
					After first year of life: Yes vs. No	1.15	1.06	1.25	0.001	OR	AD outcome: Current AD
					After first year of life: Yes vs. No (Male only)	1.18	1.09	1.28	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					After first year of life: Yes vs. No (Male only)	1.19	1.07	1.32	0.001	OR	AD outcome: Current AD; Supplementary data.
					After first year of life: Yes vs. No (Female only)	1.16	1.06	1.27	0.001	OR	AD outcome: Lifetime AD; Supplementary data
					After first year of life: Yes vs. No (Female only)	1.15	1.03	1.28	0.012	OR	AD outcome: Current AD; Supplementary data.
					After first year of life: Yes vs. No (southern cities)	1.16	1.08	1.25	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					After first year of life: Yes vs. No (southern cities)	1.16	1.06	1.27	0.002	OR	AD outcome: Current AD; Supplementary data.
					After first year of life: Yes vs. No (northern cities only)	1.14	1.02	1.27	0.019	OR	AD outcome: Lifetime AD; Supplementary data
					After first year of life: Yes vs. No (high income level only)	1.19	1.11	1.27	<0.001	OR	AD outcome: Lifetime AD; Supplementary data
					After first year of life: Yes vs. No (High income level only)	1.22	1.12	1.33	<0.001	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	During first year of life: Yes vs. no	1.17	1.02	1.35	-	OR	AD outcome: Lifetime AD
					After first year of life: Yes vs. no	1.17	1.06	1.29	-	OR	AD outcome: Lifetime AD
					After first year of life: Yes vs. No	1.18	1.05	1.32	-	OR	AD outcome: Current AD
Deng et al., 2016	25	Cross-sectional	children	China	Yes vs. No	1.34	1.06	1.69	<0.05	OR	
House painting											
Wen et al., 2009	158	Birth cohort	children	Taiwan	Yes vs. No	1.72	1.30	2.24	<0.001	OR	
Combined home renovation activities											
Wen et al., 2009	158	Birth cohort	children	Taiwan	Both furniture painting and renovation vs. No	1.67	1.15	2.36	<0.01	OR	
Flooring and wall material											
Flooring material in child's bedroom											
Sun et al., 2019	8	Cross-sectional	children	China	Laminate flooring vs. Cement (Southern cities only)	1.24	1.00	1.53	0.048	OR	AD outcome: Lifetime AD; Supplementary data.

					Solid wood vs. Cement	1.27	1.05	1.52	0.12	OR	AD outcome: Current AD
					Solid wood vs. Cement (male only)	1.38	1.08	1.77	0.009	OR	AD outcome: Current AD; Supplementary data.
					Solid wood vs. Cement (southern cities only)	1.30	1.06	1.59	0.012	OR	AD outcome: Current AD; Supplementary data.
					Solid wood vs. Cement (high income level only)	1.45	1.15	1.82	0.002	OR	AD outcome: Current AD; Supplementary data.
					Tiles/ceramic, stone vs. Cement	1.24	1.04	1.48	0.18	OR	AD outcome: Current AD
					Tiles/ceramic, stone vs. Cement (male only)	1.30	1.02	1.65	0.031	OR	AD outcome: Current AD; Supplementary data.
					Tiles/ceramic, stone vs. Cement (southern cities only)	1.29	1.06	1.56	0.011	OR	AD outcome: Current AD; Supplementary data.
					Tiles/ceramic, stone vs. Cement (high income level only)	1.41	1.12	1.75	0.003	OR	AD outcome: Current AD; Supplementary data.
Cai et al., 2017	18	Cross-sectional	children	China	Solid wood vs. Cement	1.42	1.16	1.73	-	OR	AD outcome: Lifetime AD
					Solid wood vs. Cement	1.70	1.29	2.23	-	OR	AD outcome: Current AD
					Laminate wood vs. Cement	1.58	1.26	1.98	-	OR	AD outcome: Lifetime AD
					Laminate wood vs. Cement	1.92	1.42	2.59	-	OR	AD outcome: Current AD
					Others vs. Cement	1.68	1.13	2.50	-	OR	AD outcome: Current AD
Wall material in child's bedroom											
Sun et al., 2019	8	Cross-sectional	children	China	Wallpaper vs. Lime	1.39	1.16	1.67	<0.001	OR	AD outcome: Current AD
					Wallpaper vs. Lime (male only)	1.48	1.16	1.89	0.001	OR	AD outcome: Current AD; Supplementary data.
					Wallpaper vs. Lime (southern cities only)	1.4	1.15	1.70	0.001	OR	AD outcome: Current AD; Supplementary data.
					Wallpaper vs. Lime (high income level only)	1.24	1.00	1.53	0.05	OR	AD outcome: Current AD; Supplementary data.
					Wallpaper vs. Lime (low income level only)	1.38	1.01	1.89	0.043	OR	AD outcome: Current AD; Supplementary data.
					Oil paint vs. Lime	1.39	1.17	1.66	<0.001	OR	AD outcome: Current AD
					Oil paint vs. Lime (male only)	1.40	1.10	1.77	0.006	OR	AD outcome: Current AD; Supplementary data.
					Oil paint vs. Lime (female only)	1.31	1.03	1.66	0.03	OR	AD outcome: Current AD; Supplementary data.
					Oil paint vs. Lime (southern cities only)	1.43	1.19	1.70	0.000	OR	AD outcome: Current AD; Supplementary data.
					Oil paint vs. Lime (high income level only)	1.37	1.13	1.66	0.001	OR	AD outcome: Current AD; Supplementary data.
					Emulsion paint vs. Lime	1.27	1.1	1.46	0.001	OR	AD outcome: Current AD
					Emulsion paint vs. Lime (male only)	1.32	1.09	1.60	0.004	OR	AD outcome: Current AD; Supplementary data.
					Emulsion paint vs. Lime (southern cities only)	1.34	1.15	1.56	0.000	OR	AD outcome: Current AD; Supplementary data.
					Emulsion paint vs. Lime (high income level only)	1.22	1.03	1.44	0.023	OR	AD outcome: Current AD; Supplementary data.

					Cement vs. Lime (low income level)	1.58	1.11	2.25	0.012	OR	AD outcome: Current AD; Supplementary data.
Household dampness											
Damp clothing/bedding											
Wang et al., 2019	9	Cross-sectional	children	China	Yes vs. No	1.35	1.16	1.56	<0.001	OR	
Cai et al., 2017	18	Cross-sectional	children	China	At current residence: Yes vs. No	1.22	1.12	1.34	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.19	1.07	1.33	-	OR	AD outcome: Current AD
Cai et al., 2016	23	Cross-sectional	children	China	Yes vs. No	1.27	1.15	1.39	-	OR	AD outcome: Lifetime AD
					Yes vs. No	1.24	1.11	1.39	-	OR	AD outcome: Current AD
					Yes vs. No (female only)	1.25	1.09	1.42	-	OR	AD outcome: Lifetime AD
					Yes vs. No (female only)	1.26	1.07	1.47	-	OR	AD outcome: Current AD
					Yes vs. No (male only)	1.28	1.13	1.46	-	OR	AD outcome: Lifetime AD
					Yes vs. No (male only)	1.23	1.05	1.44	-	OR	AD outcome: Current AD
					Yes vs. No (individuals with familial atopic diseases only)	1.32	1.13	1.55	-	OR	AD outcome: Lifetime AD
					Yes vs. No (individuals with familial atopic diseases only)	1.23	1.03	1.48	-	OR	AD outcome: Current AD
					Yes vs. No (individuals without familial atopic diseases only)	1.24	1.11	1.39	-	OR	AD outcome: Lifetime AD
					Yes vs. No (individuals without familial atopic diseases only)	1.25	1.08	1.44	-	OR	AD outcome: Current AD
Moulds spots											
Cai et al., 2017	18	Cross-sectional	children	China	Residence at child's birth: Yes vs. No	1.41	1.25	1.59	-	OR	AD outcome: Lifetime AD
					Residence at child's birth: Yes vs. No	1.23	1.06	1.43	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No	1.32	1.13	1.54	-	OR	AD outcome: Lifetime AD
Cai et al., 2016	23	Cross-sectional	children	China	At current residence: Yes vs. No	1.34	1.14	1.58	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (females only)	1.52	1.21	1.92	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (females only)	1.34	1.02	1.77	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (individuals without family atopic diseases only)	1.37	1.12	1.68	-	OR	AD outcome: Lifetime AD
Xu et al., 2016	34	Cross-sectional	children	China	Yes vs. No	2.00	1.48	2.70	<0.001		
					Yes vs. No (individuals without familial atopic diseases only)	1.64	1.04	2.60	<0.05	OR	
					Yes vs. No (individuals with familial atopic diseases only)	2.32	1.54	3.49	<0.001	OR	
Altuğ et al., 2013	49	Cross-sectional	children and adolescents	Turkey	Yes vs. No	1.68	1.03	2.74	-	OR	AD outcome: current chronic rash
Ukawa et al., 2013	54	Cross-sectional	children	Japan	Yes vs. No	1.25	1.05	1.49	<0.05	OR	
					Yes vs. No (males only)	1.28	1.00	1.64	<0.05	OR	
Wen et al., 2009	159	Birth cohort	children	Taiwan	Yes vs. No	2.14	1.41	3.22	<0.05	OR	
					Number of fungus on walls: Low (1) vs. No	1.33	1.13	1.57	<0.001	OR	

					Number of fungus on wall: High (>1) vs. No	1.23	1.07	1.42	<0.02	OR	
Lee et al., 2007	97	Cross-sectional	children	Taiwan	Number of walls with moulds: 1 vs. 0	1.34	1.15	1.55	-	OR	
					Number of walls with moulds: ≥2 vs. 0	1.70	1.40	2.05	-	OR	
					Yes vs. No (males only)	1.40	1.18	1.66	-	OR	
					Yes vs. No (females only)	1.46	1.22	1.70	-	OR	
					Yes vs. No (male with parental atopic diseases only)	1.39	1.10	1.75	-	OR	
					Yes vs. No (females without parental atopic diseases only)	1.62	1.21	2.16	-	OR	
Damp stains at current residence											
Cai et al., 2017	18	Cross-sectional	children	China	At child's bedroom in current residence: Yes vs. No	1.34	1.19	1.51	-	OR	AD outcome: Lifetime AD
					At child's bedroom in current residence: Yes vs. No	1.19	1.03	1.37	-	OR	AD outcome: Current AD
Cai et al., 2016	23	Cross-sectional	children	China	At current residence: Yes vs. No	1.38	1.22	1.56	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.23	1.06	1.42	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (females only)	1.46	1.22	1.73	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (females only)	1.30	1.06	1.60	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (males only)	1.32	1.11	1.56	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals with familial atopic diseases only)	1.32	1.08	1.61	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without family atopic diseases only)	1.41	1.21	1.64	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without family atopic diseases only)	1.31	1.08	1.58	-	OR	AD outcome: Current AD
Lin et al., 2015	38	Cross-sectional	children	China	At child's bedroom: Yes vs. No	1.71	1.06	2.78	-	OR	
Mould spots/damp stains											
Wang et al., 2019	9	Cross-sectional	children	China	At current residence and residence during child's birth: Only in past years (moulds/damp stains) vs. Never	1.47	1.15	1.86	0.002	OR	
					At current residence and residence during child's birth: Only currently (moulds/damp stains) vs. Never	1.7	1.36	2.12	<0.001	OR	
					At current residence and residence during child's birth: Past and current (moulds/damp stains) vs. Never	1.5	1.12	2.02	0.007	OR	
	23		children	China	Perinatal residence: Yes vs. No	1.46	1.29	1.66	-	OR	AD outcome: Lifetime AD

Cai et al., 2016		Cross-sectional			Perinatal residence: Yes vs. No	1.31	1.12	1.52	-	OR	AD outcome: Current AD
					Perinatal residence: Yes vs. No (males only)	1.32	1.11	1.57	-	OR	AD outcome: Lifetime AD
					Perinatal residence: Yes vs. No (females only)	1.63	1.36	1.94	-	OR	AD outcome: Lifetime AD
					Perinatal residence: Yes vs. No (females only)	1.50	1.22	1.85	-	OR	AD outcome: Current AD
					Perinatal residence: Yes vs. No (individuals with familial atopic diseases only)	1.64	1.33	2.03	-	OR	AD outcome: Lifetime AD
					Perinatal residence: Yes vs. No (individuals with familial atopic diseases only)	1.31	1.04	1.66	-	OR	AD outcome: Current AD
					Perinatal residence: Yes vs. No (individuals without familial atopic diseases only)	1.37	1.18	1.61	-	OR	AD outcome: Lifetime AD
					Perinatal residence: Yes vs. No (individuals without familial atopic diseases only)	1.31	1.07	1.59	-	OR	AD outcome: Current AD
Deng et al., 2016	25	Cross-sectional	children	China	Prenatal residence: Yes (mould/damp stains) vs. No	1.40	1.09	1.80	<0.01	OR	
Miyake et al., 2007	160	Birth cohort	children	Japan	Moulds in kitchen during pregnancy	1.86	1.08	3.15	-		
					Moulds in kitchen during pregnancy (individuals without parental atopic diseases)	2.93	1.27	6.75	-		
Mouldy odour											
Cai et al., 2017	18	Cross-sectional	children	China	At residence during child's birth: Yes vs. No	1.41	1.20	1.65	-	OR	AD outcome: Lifetime AD
					At residence during child's birth: Yes vs. No	1.28	1.05	1.55	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No	1.13	1.00	1.27	-	OR	AD outcome: Current AD
Cai et al., 2016	23	Cross-sectional	children	China	At perinatal residence: Yes vs. No	1.46	1.24	1.72	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No	1.32	1.08	1.61	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (females only)	1.30	1.02	1.65	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No (females only)	1.35	1.02	1.80	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (males only)	1.63	1.31	2.04	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No (males only)	1.31	1.00	1.73	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (individuals with familial atopic diseases only)	1.64	1.24	2.18	-	OR	AD outcome: Lifetime AD

					At perinatal residence: Yes vs. No (individuals with familial atopic diseases only)	1.51	1.11	2.05	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (individuals without familial atopic diseases only)	1.39	1.13	1.70	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.40	1.21	1.61	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.20	1.05	1.37	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (females only)	1.37	1.12	1.68	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (males only)	1.43	1.18	1.73	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (males only)	1.35	1.12	1.63	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (individuals with familial atopic diseases only)	1.38	1.09	1.74	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.42	1.29	1.69	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.32	1.06	1.65	-	OR	AD outcome: Current AD
Lin et al., 2015	38	Cross-sectional	children	China	At child's bedroom: Yes vs. No	1.86	1.08	3.23	-	OR	
Ukawa et al., 2013	54	Cross-sectional	children	Japan	Yes vs. No	1.54	1.10	2.14	-	OR	
					Yes vs. No (male only)	1.64	1.00	1.64	-	OR	
Water leakage/damage											
Wang et al., 2019	9	Cross-sectional	children	China	At current residence: In the past years vs. Never	1.96	1.58	2.44	<0.001	OR	
					At current residence: In the past 12 months vs. Never	1.44	1.12	1.87	0.005	OR	
Cai et al., 2017	18	Cross-sectional	children	China	At current residence: Yes vs. No	1.33	1.18	1.48	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.24	1.09	1.43	-	OR	AD outcome: Current AD
Lin et al., 2015	38	Cross-sectional	children	China	Yes vs. No	2.09	1.30	3.34	-	OR	
Cai et al., 2016	23	Cross-sectional	children	China	At current residence: Yes vs. No	1.36	1.21	1.53	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.27	1.11	1.39	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (female only)	1.49	1.26	1.75	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (female only)	1.33	1.10	1.62	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (male only)	1.25	1.06	1.47	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (male only)	1.22	1.00	1.48	-	OR	AD outcome: Current AD

					At current residence: Yes vs. No (individuals with familial atopic diseases only)	1.34	1.11	1.62	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.37	1.18	1.58	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.32	1.10	1.58	-	OR	AD outcome: Current AD
Windowpanes condensation											
Wang et al., 2019	9	Cross-sectional	children	China	At current residence and residence during child's birth: Only currently vs. Never	1.36	1.00	1.84	0.049	OR	
					At current residence and residence during child's birth: Past and current vs. Never	1.77	1.46	2.15	<0.001	OR	
Cai et al., 2017	18	Cross-sectional	children	China	At residence during child's birth: Yes vs. No	1.23	1.12	1.34	-	OR	AD outcome: Lifetime AD
					At residence during child's birth: Yes vs. No	1.24	1.11	1.38	-	OR	AD outcome: Current AD
					At child's bedroom in current residence: Yes vs. No	1.31	1.18	1.46	-	OR	AD outcome: Lifetime AD
					At child's bedroom in current residence: Yes vs. No	1.47	1.29	1.67	-	OR	AD outcome: Current AD
Deng et al., 2016	25	Cross-sectional	children	China	At prenatal residence: Yes vs. No	1.37	1.12	1.66	<0.01	OR	
					At postnatal residence: Yes vs. No	1.44	1.14	1.80	<0.01	OR	
Cai et al., 2016	23	Cross-sectional	children	China	At perinatal residence: Yes vs. No	1.25	1.14	1.37	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No	1.26	1.12	1.41	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (female only)	1.33	1.17	1.52	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No (female only)	1.38	1.18	1.62	-	OR	AD outcome: Current AD
					At perinatal residence: Yes vs. No (male only)	1.18	1.04	1.35	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No (individuals without familial atopic diseases only)	1.30	1.17	1.46	-	OR	AD outcome: Lifetime AD
					At perinatal residence: Yes vs. No (individuals without familial atopic diseases only)	1.32	1.15	1.52	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No	1.35	1.21	1.51	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No	1.46	1.28	1.66	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (female only)	1.28	1.10	1.50	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (female only)	1.39	1.16	1.67	-	OR	AD outcome: Current AD

					At current residence: Yes vs. No (male only)	1.42	1.22	1.65	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (male only)	1.53	1.27	1.84	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (individuals with familial atopic diseases only)	1.23	1.02	1.48	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals with familial atopic diseases only)	1.33	1.08	1.64	-	OR	AD outcome: Current AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.41	1.23	1.62	-	OR	AD outcome: Lifetime AD
					At current residence: Yes vs. No (individuals without familial atopic diseases only)	1.54	1.30	1.82	-	OR	AD outcome: Current AD
Ukawa et al., 2013	54	Cross-sectional	children	Japan	Yes vs. No	1.25	1.05	1.48	<0.05	OR	
Combined dampness indicators											
Lin et al., 2015	41	Cross-sectional	children	China	Dampness level (continuous)	1.72	1.15	2.57	-	OR	6 signs of dampness: mould spots, damp stains, damp beddings, water leakage, water condensation on windows and mould tabulated to give a total score.
Household activities and conditions											
Cooking fuel											
Norbäck et al., 2019	7	Cross-sectional	children	China	Cooking fuel: Any biomass (coal/wood) vs. electricity	1.21	1.06	1.39	≤0.01	OR	
Singh et al., 2018	17	Cross-sectional	children and adolescents	India	Cooking fuel: Yes vs. no (13-14 years-old)	2.1	1.7	2.5	<0.0001	OR	
Mosquito coil/incense burning											
Norbäck et al., 2019	7	Cross-sectional	children	China	Mosquito coil burning	1.15	1.07	1.23	≤0.001	OR	
Lee et al., 2007	97	Cross-sectional	children	Taiwan	Incense burning: Yes vs. No	0.85	0.75	0.95	-	OR	
Heating system/air purifier											
Ukawa et al., 2013	54	Cross-sectional	children	Japan	Heating system: Non-electric without ventilation duct to outside vs. Electronic	1.45	1.01	2.11	<0.05	OR	
Ergin et al., 2008	88	Cross-sectional	children and adolescents	Turkey	Heating system: Wood vs. Electric gas	4.32	1.24	15.08	-	OR	
Cai et al., 2017	18	Cross-sectional	children	China	Air purifier use: Yes vs. No	1.28	1.10	1.50	-	OR	AD outcome: Lifetime AD
					Air purifier use: Yes vs. No	1.31	1.10	1.57	-	OR	AD outcome: Current AD

Household pests											
Cai et al., 2017	18	Cross-sectional	children	China	Household pests (cockroaches): Yes vs. No	1.23	1.12	1.34	-	OR	AD outcome: Lifetime AD
					Household pest (mosquitoes or flies): Yes vs. No	1.28	1.12	1.47	-	OR	AD outcome: Lifetime AD
					Household pests (mosquitoes or flies): Yes vs. No	1.17	1.05	1.31	-	OR	AD outcome: Current AD
Lee et al., 2007	97	Cross-sectional	children	Taiwan	Household pests (cockroaches): Yes vs. No (females only)	1.18	1.00	1.40	-	OR	
Habit of opening windows											
Cai et al., 2017	18	Cross-sectional	children	China	Opening windows during sleep in summer: Never vs. Often	1.31	1.12	1.52	-	OR	AD outcome: Lifetime AD
					Opening windows during sleep in summer: Never vs. Often	1.28	1.07	1.54	-	OR	AD outcome: Current AD
Cleaning habits											
Cai et al., 2017	18	Cross-sectional	children	China	Cleaning the floor of child's bedroom: Everyday vs. at least twice a week	0.85	0.76	0.95	-	OR	AD outcome: Current AD
					Bedding taken out to sun: Yes vs. No	1.13	1.01	1.27	-	OR	AD outcome: Lifetime AD
Miyake et al., 2007	160	Birth cohort	children	Japan	Vacuuming living room during pregnancy: ≥3 vs. <3 times per week	0.50	0.29	0.84	-	OR	
					Vacuuming mother's bedroom during pregnancy: ≥3 vs. <3 times per week	0.53	0.31	0.89	-	OR	
Household appliances											
Wen et al., 2009	159	Birth cohort	children	Taiwan	Microwave use: >5 times/week vs. Do not use	1.71	1.13	2.58	<0.05	OR	
Building condition											
House construction period											
Cai et al., 2017	18	Cross-sectional	children	China	1991-2000 vs. Prior to 1990	1.20	1.03	1.40	-	OR	AD outcome: Current AD
					2001-present vs. Prior to 1990	1.22	1.06	1.42	-	OR	AD outcome: Current AD
Total floors of residential building											
Cai et al., 2017	18	Cross-sectional	children	China	≥7 vs. <7	1.23	1.12	1.35	-	OR	AD outcome: Lifetime AD
					≥7 vs. <7	1.22	1.10	1.37	-	OR	AD outcome: Current AD
Level of child's bedroom											
Cai et al., 2017	18	Cross-sectional	children	China	Level ≥8 vs. 1-3	1.16	1.03	1.31	-	OR	AD outcome: Lifetime AD
					Level ≥8 vs. 1-3	1.21	1.05	1.39	-	OR	AD outcome: Current AD

***Mixed: study investigated a mixed of children, adolescents, and adults.**

Supplemental Table 7: Significant estimates of personal lifestyle factors

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, PR, RR)	Remarks
Smoking											
Active smoking											
Graif et al., 2013	56	Cross-sectional	adolescents	Israel	Occasional vs. Never	1.6	1.2	2.3	<0.05	OR	
					Daily vs. Never	2.2	1.4	3.6	<0.05	OR	
Lee et al., 2008	98	Cross-sectional	children and adolescents	Taiwan	Yes vs. No (male only)	1.28	1.08	1.53	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (male only)	1.35	1.10	1.65	<0.01	OR	AD outcome: chronic flexural itchy rash
					Yes vs. No (female only)	2.08	1.56	2.76	<0.01	OR	AD outcome: chronic itchy rash
					Yes vs. No (female only)	2.07	1.48	2.89	<0.01	OR	AD outcome: chronic flexural itchy rash
Lee et al., 2007	107	Cross-sectional	adolescents	Taiwan	Yes vs. No (females in 1995-1996 study only)	2.2	1.0	4.7	<0.05	OR	
					Yes vs. No (females in 2001 study only)	3.0	1.3	6.1	<0.01	OR	
Passive smoking (environmental tobacco smoke exposure)											
Norbäck et al., 2019	7	Cross-sectional	children	China	Lifetime exposure: Yes vs. No	1.06	1.00	1.12	≤0.05	OR	
Guo et al., 2016	27	Cross-sectional	children	China	Exposure during pregnancy (through mother) or/and after birth: Yes vs. No	1.076	1.010	1.145	0.023	OR	Excluded from passive smoking as this factor includes exposure during pregnancy.
Al-Sahab et al., 2008	94	Cross-sectional	children	Lebanon	Exposure at home: Yes vs. No	1.46	1.11	1.94	-	OR	
Lee et al., 2007	106	Cross-sectional	children	Taiwan	Exposure at home: Yes vs. No	0.88	0.79	0.99	-	OR	
Animal exposure											
Cai et al., 2017	19	Cross-sectional	children	China	Domestic furred animals or birds: Yes vs. No	1.13	1.01	1.26	-	OR	
Torfi et al., 2015	46	Cross-sectional	children and adolescents	Iran	Animal exposure during the past one year: Yes vs. No	1.92	1.30	2.82	<0.05	OR	
Huang et al., 2013	57	Cross-sectional	children	China	Furred pets at birth and current: Yes vs. No pets ever	0.72	0.54	0.97	0.01<P≤0.05	OR	AD outcome: lifetime AD
					Fish at birth and current: Yes vs. No pets ever	1.47	1.12	1.93	0.001<P≤0.01	OR	AD outcome: lifetime AD
					Fish at birth and current: Yes vs. No pets ever	1.45	1.06	1.97	0.01<P≤0.05	OR	AD outcome: current AD
					Fish at current: Yes vs. No pets ever	1.22	1.03	1.45	0.01<P≤0.05	OR	AD outcome: lifetime AD

Civelek et al., 2011	70	Cross-sectional	children	Turkey	Animal exposure during the first year of life: Yes vs. No	1.47	1.06	2.03	0.022	OR	
Kurosaka et al., 2011	74	Cross-sectional	Children	Japan	Birds in room before 1 year-old	1.99	1.10	3.61	0.024	OR	
Sriyaraj et al., 2008	101	Cross-sectional	children	Thailand	Dog during first year of life	2.32	1.31	4.10	0.004	OR	AD outcome: ever chronic rash
Kurosaka et al., 2006	115	Cross-sectional	children	Japan	Domestic cats: Yes vs. No pets	0.79	0.67	0.93	0.005	OR	
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	Pets ever	1.19	1.02	1.39	<0.01	OR	
Physical activities											
Computer/TV usage											
Singh et al., 2018	17	Cross-sectional	children	India	TV usage: >3 vs ≤3 hours per day (6-7 years-old only)	1.5	1.2	1.9	<0.0001	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Computer usage: ≥5 vs. <5 times/week	1.3	1.1	1.6	-	OR	
					Computer usage: ≥5 vs. <5 times/week (Chengdu)	2.0	1.3	3.3	-	OR	
					Computer usage: ≥5 vs. <5 times/week (Hohhot)	2.1	1.2	3.9	-	OR	
Exercise											
Singh et al., 2018	17	Cross-sectional	children	India	<1 vs. ≥1 time/week (6-7 years-old only)	0.8	0.7	0.9	0.0002	OR	
					<1 vs. ≥1 time/week (13-14 years-old only)	0.8	0.7	0.9	0.01	OR	
Al-Sahab et al., 2008	94	Cross-sectional	children	Lebanon	1-2 times/week vs. Never or rarely	1.46	1.13	1.89	-	OR	
Lee et al., 2007	107	Cross-sectional	adolescents	Taiwan	Yes vs. no (males in 1995-1996 study only)	0.7	0.5	0.9	<0.01	OR	
					Yes vs. no (females in 1995-1996 study only)	0.8	0.6	1.0	<0.05	OR	
					Yes vs. no (males in 2001 study only)	0.6	0.4	0.9	<0.01	OR	
Sleeping conditions											
Bedding materials											
Waked & Salameh, 2009	93	Cross-sectional	children and adolescents	Lebanon	Cotton mattress: Yes vs. No	0.70	0.56	0.88	0.003	OR	
					Spongy pillow: Yes vs. No	1.46	1.14	1.88	0.003	OR	
Miyake et al., 2007	178	Birth cohort	children	Japan	Mite allergen level from mother's bedclothes during pregnancy: >35 vs. <2 microg/m2	3.68	1.68	7.79	-	OR	
					Mite allergen level from mother's bedclothes during pregnancy: >35 vs. <2 microg/m2 (individuals without negative parental atopic diseases)	4.96	1.35	17.57	-	OR	
					Mite allergen level from mother's bedclothes during pregnancy: >35 vs.	3.43	1.17	9.37	-	OR	

					<2 microg/m2 (individuals without negative parental atopic diseases)						
Bedroom sharing											
Ergin et al., 2008	96	Cross-sectional	children and adolescents	Turkey	Number of people sleeping in child's room: ≥4 vs. Alone	2.74	1.2	6.27	-	OR	
Diet											
Processed meat											
Cai et al., 2017	19	Cross-sectional	children	China	Smoked meat: Often vs. Not often	2.07	1.56	2.74	-	OR	AD outcome: Lifetime AD
					Smoked meat: Often vs. Not often	2.04	1.48	2.79	-	OR	AD outcome: Current AD
					Frozen meat: Often vs. Not often	1.29	1.13	1.47	-	OR	AD outcome: Lifetime AD
					Frozen meat: Often vs. Not often	1.38	1.18	1.61	-	OR	AD outcome: Current AD
					Organ meat: Often vs. Not often	1.22	1.06	1.40	-	OR	AD outcome: Lifetime AD
Common food allergens											
Odette et al., 2018	15	Cross-sectional	children	Lebanon	Pisces (shushi raw fish, grilled smoked fish, fried fish)	0.53	0.29	0.98	0.042	OR	
Miyake et al., 2008	99	Cross-sectional	Adults (pregnant women)	Japan	Fish: Q2 (36.14-54.55) vs. Q1 (<36.14)	0.59	0.34	0.99	-	OR	
Sriyaraj et al., 2008	101	Cross-sectional	children	Thailand	Nuts in past 12 months: ≥3 times/week vs. Never/occasionally	2.73	1.27	5.88	0.010	OR	AD outcome: ever chronic rash
Fruits and vegetables											
Phathamma vong et al., 2008	100	Cross-sectional	children and adolescents	Lao	Vegetables: Everyday vs. sometimes	2.96	1.49	5.88	0.002	OR	
High fat and sugar food items											
Cai et al., 2017	19	Cross-sectional	children	China	Hamburger: Often vs. Not often	0.80	0.65	0.98	-	OR	AD outcome: Current AD
					French fries: Often vs. Not often	0.83	0.73	0.95	-	OR	AD outcome: Current AD
					Sweet cake: Often vs. Not often	1.20	1.02	1.41	-	OR	AD outcome: Lifetime AD
					Jam: Often vs. Not often	1.21	1.03	1.41	-	OR	AD outcome: Lifetime AD
					Juice: Often vs. Not often	0.86	0.77	0.96	-	OR	AD outcome: Current AD
					Juice: Often vs. Not often	0.88	0.80	0.96	-	OR	AD outcome: Lifetime AD
					Popcorn: Often vs. Not often	0.78	0.62	0.98	-	OR	AD outcome: Current AD
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Carbonated drinks: ≥5 vs. <5 times/week (Hohhot)	2.0	1.1	3.1	-	OR	
Odette et al., 2018	15	Cross-sectional	children	Lebanon	White table sugar	1.77	1.05	2.97	0.03	OR	
Probiotics											
Loo et al., 2015	158	Birth cohort	children	Singapore	Probiotic consumption between 9-12 months-old: Probiotics	4.32	1.07	17.45	0.04	OR	AD outcome: AD in 12 to 18 months
Food contaminants											
Wang et al., 2014	163	Birth cohort	children	Taiwan	Monobenzyl phthalate (MBzP) in urine: >8.2000microg/g creatinine vs. <1.9048	2.50	1.08	5.79	<0.05	OR	AD outcome: AD at age 2
Dietary components											
	84		mixed		Dietary iron: Q5 vs. Q1	0.39	0.19	0.79	-	OR	

Oh et al., 2010		Cross-sectional		South Korea	Total (supplement and dietary) iron: Q5 vs. Q1	0.30	0.15	0.63	-	OR	
					Dietary β -carotene: Q2 vs. Q1	0.45	0.32	0.93	-	OR	
					Dietary β -carotene: Q5 vs. Q1	0.44	0.22	0.88	-	OR	
					Total (supplement and dietary) vitamin C: Q2 vs. Q1	0.49	0.24	0.98	-	OR	
					Dietary vitamin E: Q3 vs. Q1	0.39	0.19	0.83	-	OR	
					Dietary vitamin E: Q4 vs. Q1	0.40	0.19	0.82	-	OR	
					Dietary vitamin E: Q5 vs. Q1	0.33	0.16	0.67	-	OR	
					Total (supplement and dietary) vitamin E: Q4 vs. Q1	0.49	0.25	0.98	-	OR	
					Total (supplement and dietary) vitamin E: Q5 vs. Q1	0.46	0.22	0.96	-	OR	
					Total (supplement and dietary) folic acid: Q2 vs. Q1	0.49	0.28	0.98	-	OR	
Okuda et al., 2010	85	Cross-sectional	adolescents	Japan	α -tocopherol: Q3 vs. Q1	0.33	0.15	0.73	-	OR	
					α -tocopherol: Q4 vs. Q1	0.36	0.14	0.89	-	OR	
					γ -tocopherol: Q4 vs. Q1	2.24	1.02	4.90	-	OR	
Miyake et al., 2008	99	Cross-sectional	Adult (pregnant women)	Japan	n-3 Polyunsaturated fatty acids: Q2 (2.0196-2.4789) vs. Q1 (<2.0196)	0.54	0.31	0.93	-	OR	AD outcome: AD after age 18
					n-3/n-6 polyunsaturated fatty acids: Q2 (0.1914-0.2218) vs. Q1 (<0.1914)	0.55	0.31	0.94	-	OR	
					Eicosapentaenoic acid: Q2 (0.137-0.2232) vs. Q1 (<0.137)	0.54	0.32	0.91	-	OR	AD outcome: AD after age 18
					Docosahexaenoic acid: Q2 (0.2475-0.3616) vs. Q1 (<0.2475)	0.53	0.32	0.89	-	OR	AD outcome: AD after age 18
					Docosahexaenoic acid: Q3 (>0.3616) vs. Q1 (<0.2475)	0.52	0.30	0.88	-	OR	AD outcome: AD after age 18
Cheng et al., 2014	18	Cross-sectional	children and adolescents	South Korea	Serum vitamin D: Inadequate (12-<20 ng/ml) vs. Adequate (\geq 20ng/ml)	1.50	1.02	2.06	-	OR	
					Serum vitamin D: Deficient (<12ng/ml) vs. Adequate (\geq 20ng/ml)	1.48	1.04	2.12	-	OR	
Choosy in food											
Guo et al., 2016	27	Cross-sectional	children	China	Choosy in food: Yes vs. No	1.272	1.135	1.425	<0.001	OR	
Personal hygiene											
Ferrandiz-Mont et al., 2018	13	Cross-sectional	children	Indonesia	Partial abulation: Frequent vs. infrequent	0.36	0.13	0.96	-	OR	Partial abulation: a cleaning practice by the Muslim community.

***Mixed: study investigated a mixed of children, adolescents, and adults.**

Supplemental Table 8: Significant estimates of family lifestyle factors

Study	Reference number in Supplementary Appendix 1	Study design	Study population (children, adolescents, adult, mixed*)	Country/region	Risk factor definition	Estimate	Lower CI	Upper CI	p-value	Measure of estimates (OR, HR, RR, PR)	Remarks
Smoking											
Foetal environmental tobacco smoke exposure											
Goudarzi et al., 2018	146	Birth cohort	children	Japan	Maternal serum cotinine during pregnancy (continuous) (AD at 7 years-old)	0.88	0.79	0.99	0.044	RR	
Lee et al., 2012	64	Cross-sectional	children and adolescents	Hong Kong	Mother do not smoke but exposed to tobacco smoke during pregnancy vs. No maternal smoking and no ETS exposure during pregnancy	1.59	1.35	1.85	<0.001	OR	
Lee et al., 2004	121	Cross-sectional	children	Hong Kong	Parents smoked during pregnancy	1.81	1.60	2.05	<0.01	OR	
Maternal smoking											
Singh et al., 2018	17	Cross-sectional	children and adolescents	India	Yes vs. No (6-7 years-old only)	3.5	2.6	4.8	<0.0001	OR	
					Yes vs. No (13-14 years-old only)	2.6	2.0	3.4	<0.0001	OR	
Song et al., 2014	52	Cross-sectional	children and adolescents	China	Yes vs. No	2.2	1.0	4.5	<0.05	OR	AD outcome: Lifetime chronic itchy rash
Yi et al., 2012	69	Cross-sectional	children	South Korea	Mother smoke during pregnancy and/or in early years of child's life vs. No exposure	1.98	1.01	3.89	-	OR	AD outcome: Lifetime chronic itchy rash
					Mother smoke during pregnancy and/or in early years of child's life vs. No exposure	2.06	1.01	4.22	-	OR	AD outcome: Current chronic itchy rash
					Mother smoke during pregnancy and/or in early years of child's life vs. No exposure	2.74	1.22	6.18	-	OR	AD outcome: Current treated AD
Sriyaraj et al., 2008	101	Cross-sectional	children	Thailand	Yes vs. No	5.85	1.97	17.35	0.001	OR	AD outcome: Lifetime chronic itchy rash
Paternal smoking											
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Ex-smoker (stopped for >1-year) vs. Never smoked (singletons who has normal birthweight and mother had no diseases during pregnancy only)	1.19	1.09	1.30	<0.001	OR	Normal birthweight defined as 2500-4000g.
					Current smoker vs. Never smoked (singletons who has normal birthweight and mother had no diseases during pregnancy only)	1.07	1.02	1.13	0.007	OR	Normal birthweight defined as 2500-4000g.
Singh et al., 2018	17	Cross-sectional	children and adolescents	India	Yes vs. No (6-7 years-old only)	1.5	1.3	1.8	<0.0001	OR	
					Yes vs. No (13-14 years-old only)	1.3	1.2	1.5	<0.0001	OR	
Song et al., 2014	52	Cross-sectional	children and adolescents	China	Yes vs. No	1.5	1.2	2.0	<0.01	OR	AD outcome: Ever chronic itchy rash
					Yes vs. No	1.3	1.2	1.5	<0.0001	OR	AD outcome: Ever AD
Parental smokers											

Li et al., 2011	76	Cross-sectional	children and adolescents	China	Yes vs. No (Xian)	1.8	1.0	3.1	-	OR	Smokers include both ex- and current smokers
Household smokers											
Abdualrasol et al., 2018	12	Cross-sectional	adolescents	Kuwait	≥1 household member vs. 0	1.48	1.03	2.14	0.034	PR	
Lee et al., 2007	107	Cross-sectional	adolescents	Taiwan	≥21 daily cigarette consumption at home vs. 0 (females in 1995-1996 study only)	1.7	1.2	2.3	<0.01	OR	
					1-10 daily cigarette consumption at home vs. 0 (females in 2001 study only)	0.6	0.4	0.8	<0.05	OR	
Yi et al., 2012	69	Cross-sectional	children	South Korea	Mother do not smoke but other household members smoke during pregnancy and/or during early years of child's life vs. No tobacco smoke exposure	1.43	1.24	1.65	-	OR	AD outcome: Lifetime chronic itchy rash
					Mother do not smoke but other household members smoke during pregnancy and/or during early years of child's life vs. No tobacco smoke exposure	1.35	1.15	1.58	-	OR	AD outcome: Current chronic itchy rash
					Mother do not smoke but other household members smoke during pregnancy and/or during early years of child's life vs. No tobacco smoke exposure	1.40	1.22	1.62	-	OR	AD outcome: Lifetime physician-diagnosed AD
					Mother do not smoke but other household members smoke during pregnancy and/or during early years of child's life vs. No tobacco smoke exposure	1.26	1.04	1.53	-	OR	AD outcome: Current treated AD
					At least 1 household member smokes vs. No exposure	1.18	1.01	1.37	-	OR	AD outcome: Lifetime chronic itchy rash
					At least 1 household member smokes vs. No exposure	1.27	1.07	1.52	-	OR	AD outcome: Current chronic itchy rash
					At least 1 household member smokes vs. No exposure	1.32	1.06	1.64	-	OR	AD outcome: Current treated AD
Tanaka et al., 2007	109	Cross-sectional	children and adolescents	Japan	Former smoking vs. Never smoking in household	1.21	1.01	1.44	-	OR	
Ergin et al., 2008	96	Cross-sectional	children and adolescents	Turkey	≥3 household members vs. None	4.06	1.65	9.97	-	OR	
Maternal diet during pregnancy											
Food items											
Saito et al., 2010	173	Birth cohort	children	Japan	Meat during pregnancy: Q4 vs. Q1	2.59	1.15	6.17	-	OR	Based on diet history questionnaire and converted into daily intake
Miyake et al., 2010	172	Birth cohort	children	Japan	Total dairy products during pregnancy: Q2 (quartile median=120.8g/day) vs. Q1 (quartile median=43.6g/day)	0.45	0.25	0.81	-	OR	Based on diet history questionnaire and converted into daily intake; Includes milk, yoghurt and cheese
Gao et al., 2019	141	Birth cohort	children	China	Milk/milk products during pregnancy: 3-4 vs. ≤2 times a week	1.81	1.17	2.8	0.008	OR	

					Eggs during pregnancy: 3-4 vs. ≤ 2 times a week	0.51	0.32	0.81	0.005	OR	
Miyake et al., 2010	171	Birth cohort	children	Japan	Green and yellow vegetables during pregnancy: Q3 (quartile median=54.9g/day) vs. Q1 (quartile median=27.6g/day)	0.30	0.16	0.52	-	OR	Based on diet history questionnaire and converted into daily intake
					Green and yellow vegetables during pregnancy: Q3 (quartile median=77.5g/day) vs. Q1 (quartile median=27.6g/day)	0.53	0.31	0.89	-	OR	Based on diet history questionnaire and converted into daily intake
					Green and yellow vegetables during pregnancy: Q3 (quartile median=125.8g/day) vs. Q1 (quartile median=27.6g/day)	0.41	0.24	0.71	-	OR	Based on diet history questionnaire and converted into daily intake
					Apples during pregnancy: Q3 (quartile median=16.7g/day) vs. Q1 (quartile median=0.3g/day)	0.55	0.30	0.98	-	OR	Based on diet history questionnaire and converted into daily intake
					Citrus fruits during pregnancy: Q2 (quartile median=34.8g/day) vs. Q1 (quartile median=-0.5g/day)	0.57	0.33	0.98	-	OR	Based on diet history questionnaire and converted into daily intake
					Citrus fruits during pregnancy: Q2 (quartile median=87.1g/day) vs. Q1 (quartile median=-0.5g/day)	0.53	0.30	0.93	-	OR	Based on diet history questionnaire and converted into daily intake
Dietary components											
Miyake et al., 2010	171	Birth cohort	children	Japan	Beta-carotene during pregnancy: Q2 (quartile median=1923.9microg/day) vs. Q1 (1180.9microg/day)	0.52	0.30	0.89	-	OR	Based on diet history questionnaire and converted into daily intake
					Beta-carotene during pregnancy: Q4 (quartile median=4218.0microg/day) vs. Q1 (1180.9microg/day)	0.52	0.30	0.89	-	OR	Based on diet history questionnaire and converted into daily intake
					Vitamin E during pregnancy: Q2 (quartile median=7.3microg/day) vs. Q1 (quartile median=6.1microg/day)	0.58	0.33	0.99	-	OR	Based on diet history questionnaire and converted into daily intake
Saito et al., 2010	173	Birth cohort	children	Japan	Total fat during pregnancy: Q2 vs. Q1	2.73	1.27	6.24	-	OR	Based on diet history questionnaire and converted into daily intake
					Monosaturated fatty acids during pregnancy: Q2 vs. Q1	3.50	1.58	8.33	-	OR	Based on diet history questionnaire and converted into daily intake
					α -linolenic acid during pregnancy: Q2 vs. Q1	1.59	0.73	3.57	-	OR	Based on diet history questionnaire and converted into daily intake
					Linolenic acid during pregnancy: Q4 (quartile median=13.8g/day) vs. Q1 (8.8g/day)	2.11	1.06	4.26	-	OR	Based on diet history questionnaire and converted into daily intake
					n-6 polyunsaturated fatty acids during pregnancy: Q2 vs. Q1	2.42	1.11	5.55	-	OR	Based on diet history questionnaire and converted into daily intake
Miyake et al., 2009	174	Birth cohort	children	Japan	n-6 polyunsaturated fatty acids during pregnancy: Q4 (quartile median=14.1g/day) vs. Q1 (9.0g/day)	2.25	1.13	4.54	-	OR	Based on diet history questionnaire and converted into daily intake

Place of birth											
Wong et al., 2007	111	Cross-sectional	children	Hong Kong	Hong Kong vs. China	12.21	-	-	0.016	OR	
Mode of delivery											
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Caesarean section vs. Vaginal delivery (only singletons who has normal birthweight (2500-4000g) and mother with no diseases during pregnancy)	1.07	1.01	1.12	0.012	OR	birthweight (2500-4000g)
Yu et al., 2015	47	Cross-sectional	children and adolescents	South Korea	Caesarean section vs. vaginal delivery	1.80	1.14	2.85	0.012	OR	
Li et al., 2011	76	Cross-sectional	children and adolescents	China	Caesarean section vs. Vaginal delivery (Hohhot only)	1.67	1.43	2.50	-	OR	
Birth month/season											
Gao et al., 2019	141	Birth cohort	children	China	Autumn-winter vs. spring-summer	1.38	1	1.91	0.052	OR	Concluded as significant by the paper
Cai et al., 2017	19	Cross-sectional	children	China	Autumn vs. Spring	1.15	1.01	1.31	-	OR	AD outcome: Lifetime AD
					Autumn vs. Spring	1.17	1.00	1.36	-	OR	AD outcome: Current AD
Kuo et al., 2016	28	Cross-sectional	mixed	Taiwan	April vs. May	1.10	1.03	1.17	-	OR	
					June vs. May	1.08	1.01	1.15	-	OR	
					September vs. May	1.09	1.03	1.16	-	OR	
					October vs. May	1.15	1.08	1.22	-	OR	
					November vs. May	1.13	1.06	1.20	-	OR	
					December vs. May	1.17	1.10	1.25	-	OR	
Kusunoki et al., 1999	131	Cross-sectional	children and adolescents	Japan	Spring vs. other seasons combined	0.79	0.71	0.88	<0.001	OR	
					Autumn vs. other seasons combined	1.22	1.01	1.23	<0.001	OR	
Breastfeeding											
Breastfeeding											
Wang et al., 2016	154	Birth cohort	children	Taiwan	Yes vs. No	1.38	1.15	1.68	<0.001	OR	AD outcome: Chronic flexural itchy rash
					Yes vs. No	1.69	1.43	2.01	<0.001	OR	AD outcome: Physician-diagnosed AD
Breastfeeding duration											
Ho et al., 2019	5	Cross-sectional	children	Taiwan	Breastfeeding for ≥4 vs. <4 months (including none) [#]	1.33	1.20	1.49	<0.001	OR	
Cai et al., 2017	19	Cross-sectional	children	China	Breastfeeding for >6 months vs. ≤6 [#]	0.78	0.68	0.90	-	OR	AD outcome: Lifetime AD
					Breastfeeding for >6 months vs. Never [#]	0.78	0.64	0.94	-	OR	AD outcome: Lifetime AD
					Breastfeeding for >6 vs. <3 months [#]	0.76	0.65	0.89	-	OR	AD outcome: Lifetime AD
					Breastfeeding for >6 months vs. 3-6 [#]	0.80	0.68	0.93	-	OR	AD outcome: Lifetime AD
					Breastfeeding for >6 vs. ≤6 months [#]	0.76	0.63	0.90	-	OR	AD outcome: Current AD
					Breastfeeding for >6 months vs. Never [#]	0.76	0.60	0.97	-	OR	AD outcome: Current AD
					Breastfeeding for >6 vs. <3 months [#]	0.74	0.61	0.89	-	OR	AD outcome: Current AD
				Breastfeeding for >6 vs. 3-6 months [#]	0.77	0.64	0.93	-	OR	AD outcome: Current AD	

Ito & Fujiwara, 2014	162	Birth cohort	children	Japan	Breastfeeding for ≥6 months vs. Never	1.24	1.11	1.38	<0.001	OR	Developed AD from 6 to 42 months
					Breastfeeding for ≥6 months vs. Never	1.28	1.08	1.52	<0.01	OR	Developed AD from 18 to 42 months, without allergic symptoms from age 6 to 18 months
Chuang et al., 2011	168	Birth cohort	children	Taiwan	Breastfeeding for ≤1month vs. Never	1.25	1.00	1.56	0.049	OR	
					Breastfeeding for ≤2month vs. Never	1.37	1.08	1.74	0.009	OR	
					Breastfeeding for ≤6month vs. Never	1.47	1.17	1.84	0.001	OR	
					Breastfeeding for ≤12month vs. Never	1.44	1.11	1.87	0.006	OR	
					Breastfeeding for >12month vs. Never	1.49	1.15	1.93	0.003	OR	
Sahakyan et al., 2006	185	Case-control	children	Armenia	≥6 months and no maternal atopic diseases history vs. Breastfeeding for <6 months and maternal history of atopy [#]	0.139	0.050	0.385	-	OR	
Exclusive breastfeeding											
Yu et al., 2019	11	Cross-sectional	children and adolescents	China	Breastfeeding vs. Formula + breastfeeding (only singletons who has normal birthweight and mother with no diseases during pregnancy only) [#]	0.86	0.90	0.81	<0.001	OR	
					Breastfeeding vs. Formula only (only singletons who has normal birthweight and mother with no diseases during pregnancy only) [#]	1.099	1.031	1.190	0.007		
Ito & Fujiwara, 2014	162	Birth cohort	children	Japan	Exclusive breastfeeding vs. Formula only	1.26	1.12	1.41	<0.001	OR	Developed AD from 6 to 42 months
					Exclusive breastfeeding vs. Formula only	1.29	1.08	1.55	<0.01	OR	Developed AD from 18 to 42 months, without allergic symptoms from age 6 to 18 months
Miyake et al., 2003	125	Cross-sectional	children and adolescents	Japan	Exclusive breastfeeding vs. Formula only	1.56	1.13	2.22	-	OR	
Hikino et al., 2001	180	Birth cohort	children	Japan	Exclusive breastfeeding vs. Formula only [#]	1.43	1.11	1.82	-	OR	Based on follow-up at 18 months-old
					Exclusive breastfeeding vs. Formula only [#]	2.44	1.37	4.35	-	OR	Based on follow-up at 3 years-old
					Exclusive breastfeeding vs. Mixed breastfeeding [#]	1.33	1.67	1.05	-	OR	Based on follow-up at 18 months-old
Exclusive breastfeeding duration											
Yoshihiro Miyake et al., 2009	175	Birth cohort	children	Japan	Exclusive breastfeeding: ≥4 vs. <4 months (individuals without parental allergic history only)	2.41	1.10	5.55	-	OR	
Mixed breastfeeding											
Miyake et al., 2003	125	Cross-sectional	children and adolescents	Japan	Mixed breastfeeding vs. formula only	1.40	1.01	1.98	-	OR	

Mixed breastfeeding duration											
Yoshihiro Miyake et al., 2009	175	Birth cohort	children	Japan	Mixed breastfeeding: ≥6 vs. <6 months (individuals without parental atopic diseases only)	3.39	1.20	12.36	-	OR	
Solid food introduction											
Cai et al., 2017	19	Cross-sectional	children	China	Age of solid food introduction (formula, gruel and porridge only) : ≤6 vs. >6 months	1.10	1.00	1.20	-	OR	AD outcome: Lifetime AD
					Age of solid food introduction (formula, gruel and porridge only): ≤6 vs. >6 months	1.14	1.02	1.27	-	OR	AD outcome: Current AD
Sahakyan et al., 2006	185	Case-control	children	Armenia	Age of solid food introduction: <4 vs. ≤4 months	3.1	1.4	6.9	-	OR	
Carer before starting preschool											
Cai et al., 2017	19	Cross-sectional	children	China	Carer before starting preschool: Grandparents vs. Parents	1.15	1.05	1.26	-	OR	AD outcome: Lifetime AD
					Carer before starting preschool: Grandparents vs. Parents	1.20	1.08	1.35	-	OR	AD outcome: Current AD
					Carer before starting preschool: Others vs. Parents	1.36	1.00	1.85	-	OR	AD outcome: Current AD
Infancy daycare/preschool attendance											
Tokinobu et al., 2020	140	Birth cohort	children	Japan	Daycare attendance at age 6 or 18 months	1.13	1.06	1.22	-	OR	AD outcome: AD between 1.5-2.5 years-old
					Daycare attendance at age 6 or 18 months	1.34	1.21	1.47	-	OR	AD outcome: AD between 2.5-3.5 years-old
					Daycare attendance at age 6 or 18 months	1.22	1.10	1.34	-	OR	AD outcome: AD between 3.5-4.5 years-old
					Daycare attendance at age 6 or 18 months	1.15	1.04	1.27	-	OR	AD outcome: AD between 4.5-5.5 years-old
Cai et al., 2017	19	Cross-sectional	children	China	Age when starting preschool: <3 vs. ≥3 years-old	1.22	1.09	1.37	-	OR	AD outcome: Lifetime AD
					Age when starting preschool: <3 vs. ≥3 years-old	1.15	1.00	1.32	-	OR	AD outcome: Current AD
Baççioğlu et al., 2015	38	Cross-sectional	children	Turkey	Ever attended nursery	3.83	1.24	11.8	0.02	OR	
Loo et al., 2015	158	Birth cohort	children	Singapore	Attended infancy daycare	11.42	1.49	87.50	0.02	OR	Developed AD in 6 to 12 months
Bathing or showering infants											
Miyake et al., 2007	178	Birth cohort	children	Japan	Bathing or showering: ≥1 vs. <1 time a day	0.37	0.17	0.86	-	OR	
					Bathing or showering: ≥1 vs. <1 time a day (individuals with parental atopic diseases)	0.26	0.10	0.77	-	OR	

ORs and 95% CI has been converted so that the direction of the comparison and reference groups matches the other entries.

***Mixed: study investigated a mixed of children, adolescents, and adults.**